

ACTA CHIRURGIAE PLASTICAE

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INTERNATIONAL JOURNAL OF PLASTIC
SURGERY

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VOLUME VI

1964

CZECHOSLOVAKIA — PRAGUE — SZDN

F 22700.



438/64

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USE OF SKIN ISLET FLAP FROM THE DORSAL ASPECT OF INDEX FINGER FOR RESTORATION OF THE SENSITIVITY IN THE THUMB

Y. HOLEVITCH

A year ago we published a report on our method of restoring the sensitivity in the thumb by transposing the neurovascular bundle, including the terminal branching of the radial nerve, and also on our experience with the transplantation of a rocket-shaped skin flap from the dorsal aspect of the index finger. Our further experience showed that it was also possible at this site to form an islet flap on a neurovascular pedicle including the dorsal branchings of the radial artery and the radial nerve together with some minor veins.

SURGICAL TECHNIQUE

A skin islet is excised in the region of the basal phalanx of the index finger. The incision is extended proximally along the second metacarpal going round the metacarpophalangeal joint in a curve. The incision must only cut the dermo-epidermal layer of the skin which is then mobilized to both sides so that a 2 to 3 cm. broad band of subcutaneous tissue is exposed which includes both dorsal branches of the radial nerve. In small islet flaps it is permissible to use but one, the radial nerve branch. The skin itself is mobilized from its distal end. The skin together with the subcutaneous tissue is lifted off the paratenon of the extensor aponeurosis. By careful, partly sharp and partly blunt dissection the neurovascular pedicle is mobilized down to the angle between the first and second metacarpal. This part of the operation must be carried out with particular caution so as not to sever the dorsal nerve branches running to the thumb and not do damage the radial artery where it pierces the muscle from the volar side.

The transposition of the islet flap is carried out through a wide enough tunnel formed by partly blunt and partly sharp dissection, and special care must be taken not to cause a kink in the nutritive pedicle. The skin incision is then closed by suture. The proximal end of the donor site is usually somewhat narrowed down with one or two stitches and the rest of the defect covered by a free skin graft. As a rule the skin used for this purpose is excised at the recipient site (Fig. 1).

CLINICAL OBSERVATIONS

Seven patients were operated on by the above described method with the following indications:

1. Four patients to implement a skin-and-bone reconstruction of the thumb;
2. one patient to cover a defect on the tip of an amputation stump of the thumb where a tough scar had to be removed;
3. one patient to restore sensitivity of the thumb lost as a result of an unrepaired paralysis of the median and ulnar nerves;
4. one patient to replace a fresh traumatic defect of the terminal phalanx pulp in the thumb.

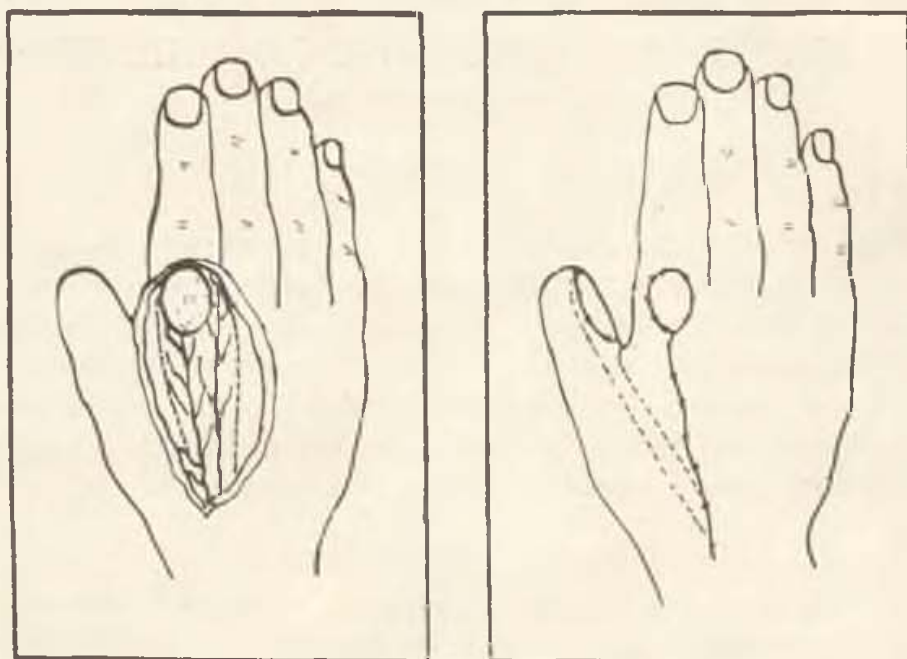


Fig. 1. Diagram of operation.

In the first group no disturbance of the blood circulation was observed. Today, in all patients sensitivity has been regained in the thumb. In the course of two to three months, gradual restoration of sensitivity could be observed along the nutritive pedicle and around the islet flap graft. The trophic condition of the thumb, too, improved considerably. Cyanosis of the distal end disappeared. The patients remained under observation for five to eight months after operation. During this period the transferred sensitivity still bore a retrospective character, i.e. when the patient's thumb was touched, he had the feeling as though the dorsal aspect of his index finger was touched. Our experience with the transposition of terminal branchings justify us in believing that after some time the patient ceases to feel the islet flap graft as part of the donor finger by elaborating new conditioned reflex links (Fig. 2).

The fifth patient, too, did not show any disturbance of the circulation. The transplanted islet flap preserved intact sensitivity (Fig. 3).



Fig. 2a.



Fig. 2b.



Fig. 2c.



Fig. 2d.

Fig. 2. Transplantation of skin islet flap in skin-and-bone reconstructed thumb according to Nicoladoni: a) outlining the islet flap; b) dissection of flap and passing it through subcutaneous tunnel; c) and d) islet flap immediately and 15 days after operation.

In the last two patients, in whom the nutritive pedicle was passed under the tough and inelastic skin on the volar aspect of the thumb, some circulatory disturbances in the islet flap graft could be observed. In the sixth patient this manifested itself by venous congestion and the appearance of blisters. Sensitivity of the islet flap graft, however, was unaffected and the treatment was concluded successfully (Fig. 4). In the seventh patient considerable venous congestion developed leading to slow necrosis of the dermo-epidermal layer of the islet flap graft, and afterwards epithelization proceeded from the surrounding tissues.

DISCUSSION

The first to use a skin islet flap on a neurovascular pedicle for the restoration of sensitivity in a denervated thumb or a thumb reconstructed by the method of Nicoladoni, was Littler in 1959. He transplants a skin islet on a neurovascular pedicle including one of the volar finger nerves with the volar-ulnar aspect of the middle or ring finger. The same method is employed by Tubiana and Duparc, Peacock and others. The method, we have described above, widens both the indications and possibilities for the use of an islet flap. New is the fact that sensitivity of the area supplied by the radial nerve is being transferred. Thus it is possible to avoid the skin of the third and fourth fingers affected by denervation. With this method it is also possible to restore sensitivity to the thumb even if the volar skin of all five digits is denervated.

On elaborating the above method, we had to find the answer to the following questions:

1. Does the sensitivity of the area supplied by the radial nerve correspond to that of the affected surface of the thumb? We were able to establish the well known difference with regard to the Weber test and the functional tests of Moberg. In practice, however, the epicritic sensitivity of the islet flap transplanted from the dorsal aspect of the index finger, proves quite adequate for the patient to use his thumb for self-service and work.

2. At what level does the skin innervation of the radial nerve actually end? According to Vishnevsky and Maximenkov the sensory branches of the radial nerve reach the proximal, in some cases, however, even the distal interphalangeal joint. But the autonomous area of the radial nerve, in which sensitivity is lowered after the nerve has been severed, is only the lateral aspect of the first metacarpal. In our patients with a chronic median nerve palsy, we detected preservation of full sensitivity up to the border line between the middle and distal third of the basal phalanx. From there up to the proximal interphalangeal joint, we found sensitivity decreased and still further distally almost complete anaesthesia. Nearly the same findings could be found in hands with intact sensitivity after an injection of novocaine to the median nerve. Some variations in sensitivity derived from the radial nerve, however, could be determined in the distal third of the basal phalanx. Sensitivity in the parts proximal to this was, without exception, always normal. This is why, in order to guarantee full sensitivity by the above-described method, the skin islet flap must not be excised beyond the border line between the middle and distal third of the basal phalanx.



Fig. 3a.



Fig. 3b.



Fig. 3c.



Fig. 3d.

Fig 3. Transplantation of skin islet flap in anaesthesia of thumb due to chronic median and ulnar nerve palsy; a) skin incision and outline of skin flap; b), c), d) dissection and transfer of islet flap.

Such a flap is short of reaching the tip of the thumb by 0.5 to 1.0 cm., unless the nutritive pedicle is stretched. In order to cover the distal volar aspect of the thumb, the islet flap must be excised with the inclusion of the skin of the distal third of the basal phalanx. Thus it may happen that part of the transplant re-

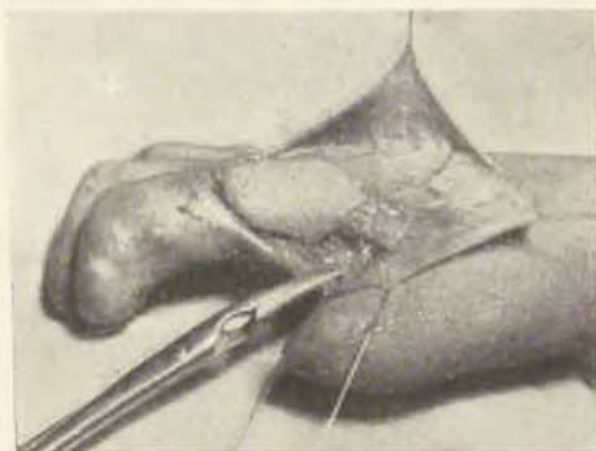


Fig. 4a.

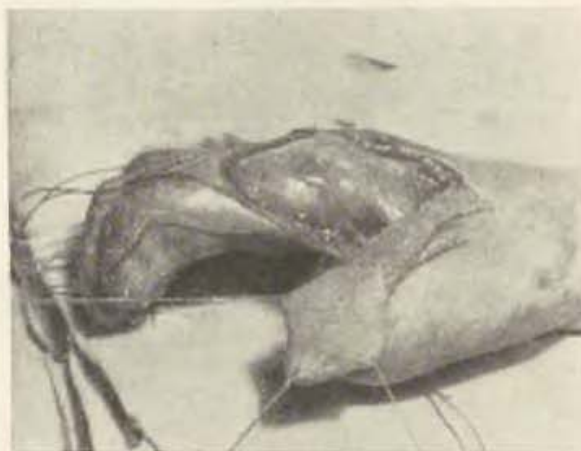


Fig. 4b.



Fig. 4c.



Fig. 4d.

Fig. 4. Transplantation of skin islet flap in a faulty amputation stump of thumb: a) — c) dissection and transposition of flap; d) islet flap 12 days after operation.

mains incompletely sensitive which must be regarded as a shortcoming of the method. In skin-and-bone reconstruction of the thumb, however, the digit is usually made somewhat shorter and in this case it is sufficient to take the islet flap from the middle third of the basal phalanx of the index finger to cover the tip of the reconstructed thumb.

3. Can one safely count on an adequate blood supply of the islet flap formed by the above described method? The terminal branches of the vessels on the dorsal aspect of fingers are always of small dimensions. Many variations and anastomoses with the arteries of the volar aspect of the fingers can be observed.

Small veins are distributed near the skin surface and do not correspond with the course of the arteries. That is why the nutritive pedicle ought to be broad enough to include the subepidermal tissue along the neurovascular bundle. The vessels and nerves must not be dissected separately. This technique ensures good blood supply to the islet flap.

Drainage of venous blood from a dorsal islet flap is better than that of volar flaps, because the venous drainage in normal fingers, too, takes place mainly via the venous network of the dorsal aspect of the hand. However, there is the danger of infringing the blood circulation by strangulation of the nutritive pedicle which is relatively broader here than in volar flaps. In practice this danger of strangulation was greater on passing the nutritive pedicle under the tough skin on the volar aspect of a denervated thumb, than through the subcutaneous tissue of a thumb reconstructed according to Nicoladoni.

4. Is there a danger in causing damage to the function of the donor finger? If small islet flaps are taken, the function of the index finger is not impaired. Even large flaps of various shape can be taken without much risk. In very large flaps, comprising half the circumference of the index finger, however, there exists the danger of infringing the venous drainage with subsequent stiffening of the joints.

The wide mobilization of skin along the nutritive pedicle is not at all connected with such danger.

CONCLUSION

Our experience with the transplantation of islet flaps from the dorsal aspect of index fingers justifies us in believing that it can be employed along with other methods of transferring sensitivity to the thumb. Both arterial blood supply and venous drainage can be regarded as ensured provided that strangulation of the nutritive pedicle is avoided. Where it is impossible to form a wide enough subcutaneous tunnel covered with elastic skin, employment of a rocket-shaped flap on a neurovascular pedicle (described by us elsewhere) should be given preference.

SUMMARY

In order to restore sensitivity of the thumb the author has used an islet skin flap taken from the dorsal aspect of the index finger in seven patients. The nutritive pedicle contained the terminal branchings of the radial nerve and the dorsal branchings of the radial artery. This method proved its value mainly as a supplementary procedure to the skin-and-bone reconstruction of the thumb according to Nicoladoni. This method was employed in one case with a traumatic defect of the pulp on the terminal phalanx of the thumb, however, the islet flap, underwent necrosis because of strangulation of the nutritive pedicle.

RÉSUMÉ

L'utilisation des lambeaux cutanés en îlot du côté dorsal du doigt index pour la restauration de la sensibilité du pouce

Y. Holeyitch

Pour restituer la sensibilité du pouce, l'auteur a utilisé un lambeau cutané en îlot, prélevé du côté dorsal du doigt index. Cette intervention a été réalisée sur 7 malades. Le pédicule nourrissant contenait les branches terminales du nerf radial et les branches dorsales de l'artère radiale. Cette méthode a fait maintes fois ses épreuves en tant que procédure supplémentaire pour la reconstruction de la peau et de l'os du pouce, d'après Nicoladoni. La méthode indiquée a été employée une fois dans un cas où il y avait eu une lésion traumatique de la face palmaire de la dernière phalange du pouce, mais le lambeau en îlot s'est nécrosé à cause de l'étranglement du pédicule nourrissant.

ZUSAMMENFASSUNG

Die Verwendung von Hautlappen von der dorsalen Seite des Zeigefingers zur Wiederherstellung der Empfindlichkeit des Daumens

Ja. Holeyitsch

Der Verfasser verwendete einen Hautlappen von der dorsalen Seite des Zeigefingers zur Wiederherstellung der Empfindlichkeit des Daumens bei sieben Patienten. Der die Ernährung besorgende Lappenstiel enthält die Endverzweigung des N. radialis sowie den dorsalen Ast der A. radialis. Dieses Verfahren bewährte sich hauptsächlich als Ergänzung der Haut-Knochen-Rekonstruktion des Daumens nach Nicoladoni. In einem Fall applizierte der Verfasser diese Technik bei traumatischem Defekt der Fingerbeere des Daumens, der transplantierte Lappen verfiel jedoch der Nekrose wegen Kompression des Lappenstiels.

RESUMEN

El uso del colgajo de piel en forma de isleta del aspecto dorsal del dedo índice para restaurar la sensibilidad del pulgar

Y. Holeyitch

Para restaurar la sensibilidad del pulgar el autor usó un colgajo de piel en forma de isleta tomado del aspecto dorsal del dedo índice en siete pacientes. El pedículo nutritivo contuvo ramificación terminal del nervio radial y la ramificación dorsal de la arteria radial. Esta técnica se hizo valer principalmente como un procedimiento suplementario en la reconstrucción de piel y hueso del pulgar según Nicoladoni. Este método se usó en un caso con el defecto traumático de la pulpa sobre la falange terminal del pulgar pero el colgajo en forma de isleta sufrió necrosis a causa de la estrangulación del pedículo nutritivo.

REFERENCES

1. **Holeyitch, Y.:** Naootchni Trudove na I. V. Kh. P. R. 4, 1—13, 1962.
2. **Littler, W.:** Neurovascular Skin Island Transfer in Reconstructive Hand Surgery. II. Intern. Congress of Plast. Surgery, London, Livingstone Ltd., 1959.
3. **Moberg, E.:** J. Bone Jt. Surg. 37-A, 1955.
4. **Peacock, E.:** Plast. reconstr. Surg. 25, 4, 298, 1960.
5. **Tubiana, F., Duparc, J.:** J. Bone Jt. Surg. 43-B, 3, 474, 1961.

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INFLUENCES OF VARIOUS HORMONES ON REGENERATIVE PROCESSES IN THE SKIN

A. I. BOOKHONOVA

Transplantation, of tissues and organs, mainly skin transplantation, is not only of general theoretical interest, but is also of great practical importance and has, therefore, attracted the attention of the research biologists and surgeons (8, 11, 12, 15). The histogenetic processes have been thoroughly studied in auto- and homotransplantation both in experimental animals and in man (1, 3, 13). The take of the tissue, particularly of a skin graft, depends, as is well known, on the conditions of metabolism, protein specificity, immunological properties, and, no doubt, also on the hormonal balance of the organism. In order to ensure a proper take of the transplant it is necessary to study beforehand the various reparative processes under different hormone concentrations in the organism. However, up to recently no investigation on an adequately broad scale has been carried out on the influence of hormones in the healing of wounds. There are comparatively few communications in the literature dealing with the functional condition of cell structures engaged in the formation of new tissues (2, 6, 10).

In view of the above, the data about the influence of hormones on the healing of skin wounds, which we have obtained from our experiments, may be of interest. We studied the action of two groups of hormones. The one group, which we conditionally indentify with the preparations of the adrenal cortex (cortisone, hydrocortisone, prednisolon and also ACTH), have a marked stimulatory effect on the processes of differentiation. The other group, which comprises desoxycorticosterone acetate, the somatotrophic hormone of the hypophysis and also the hormone of the thyroid gland, mainly activizes the proliferative processes in young tissues.

The experiments were carried out in rabbits, guinea pigs, puppies and white rats. We first report on the series of experiments in young white rats. The animals were divided into groups according to the different hormones used. As a rule one group, the control group, was not treated with hormones. The animals of the other groups received cortisone (5 mg.), hydrocortisone (3 mg.), prednisolon (3 mg.), desoxycorticosterone acetate (3 mg.), ACTH (5 u.), STH (2 mg.) and thyroxine (5 mg.), respectively.

Three days after the infliction of wounds the administration of the hormonal preparations was started. Standard skin wounds measuring 1.5×1.5 cm. were

made on the flanks of the experimental animals. After ten days the animals were killed, small sections of the wound edges were excised immediately and submitted to histological investigation. The specimens were fixed in Bouin and Shabadash solutions or in 10% neutral formalin. The slides were stained with haematoxylin and eosin, Heidenhain "azan", P-eosin "azure", Van Gieson picrofuchsin, and apart from this, the Schick test for polysaccharides and the Brash test for RNA, were carried out.

Microscopic examination of the specimens taken from the animals of the control group ten days after the infliction of wounds, showed the defect already filled with granulation tissue consisting entirely of polymorphous cells, mostly fibroblasts and histiocytes. There was a well developed vertical network of blood vessels. The basic structural elements of granulation tissue in the control animals were fibroblasts at various stages of differentiation. The superficial layers of granulation tissue showed massive infiltration of leucocytes. Between the cells fine collagenous fibres were well visible. On the border line with the intact dermis and partly also on the wound floor, there were fat cells which often had an elongated shape. They were full of specific granules which stained intensively. On treating the slides with Schiff's reagent it was found that polysaccharides were concentrated mainly in the cytoplasm of neutrophils which had infiltrated the granulation tissue and also, though in lesser amounts in macrophages and young fibroblasts. Ribonucleoproteids (RNP) were found in large quantities within the macrophages of granulation tissue and also in young fibroblasts.

The epithelial wedge, consisting of 8 to 10 cell layers, grew between the scab and the young connective tissue. The stratum of young epithelium formed small compact protuberances projecting into the underlying tissue. The cells in the middle layer of the regenerated epithelium were rich in glycogen granules which filled the entire cytoplasm. Glycogen was absent in the cells of the intact epithelium and also in the basal layer of the regenerated epithelium. The latter contained a large amount of RNP.

Bradfield (4) and Firket (16) explain accumulation of glycogen in the thick layer of regenerating epithelium by the poor supply of this part with oxygen and glucose because its cells are too distant from the blood vessels of the dermis. Apart from this, the thick scab lying on the wound surface, too, excludes the possibility of utilizing atmospheric oxygen. According to these authors this created conditions leading to anaerobic glycolysis in the epithelial cells. The glycogen reserve in the cells of the regenerating epithelium is the necessary source of energy for the synthetic processes, the most important of which is the synthesis of the protein of keratin. Glycogen disappears when epithelization of the wound surface has been completed and the epithelium starts to become horny. Berlin (2) has shown that in spite of the sharp increase in metabolic processes of the regenerating skin as compared with normal skin, re-synthesis of glycogen and ribonucleic acids exceeds their consumption.

In white rats under the influence of cortisone marked inhibition of the regenerative process was registered. In these animals very weak granulation tissue developed and in the central parts of the wound it was practically absent. The granulation tissue growing only along the wound edges showed but slight

leucocyte infiltration. The layer with the vertical network of blood vessels, which was so well represented in the epithelium of control animals, did not develop at all. Small but greatly elongated fibroblasts grew parallel with the wound surface. Histiocytes and macrophages were very scanty. Under the influence of cortisone the fat cells of the granulation tissue, found near the wound floor, were diminished in size, the granules of their cytoplasm were not so regularly distributed as in normal cells, but formed small clusters. The scanty neutrophils of the granulation tissue contained small amounts of glycogen.

The sections of epithelium adjacent to the wound showed only poor hypertrophy. Thinning of both the epidermis and the regenerated epithelial wedge was typical. The epithelial wedge consisted only of 3 to 5 layers of flattened cells and covered but a small marginal zone of the wound.

Under the influence of cortisone differentiation of the epithelial cells was hastened which manifested itself by early cornification. In the cells of the superficial layers of the young epithelial wedge granules of keratohyaline appeared very early.

In the animals, which received cortisone, glycogen diminished markedly in the cells of the regenerating epithelium. The granules of glycogen were sparsely spread over the cytoplasm of the cells of the 2 and 3 middle layers of regenerating epithelium. The reduction in glycogen in young epithelium under the influence of cortisone is evidently connected with the acceleration of the cornification process. The relationship between glycogen concentration and the intensity of cornification was pointed out earlier by Bradfield (4), Firket (16) and Falin (14).

Prednisolon and hydrocortisone show a still more retarding effect on the reparative process. Under their influence the growth of the granulation tissue, in particular, is strongly inhibited which, as after the administration of cortisone, is poor in cells. In small peripheral sections of the granulation tissue the basic substance consists of fibrous structures. The fat cells suffered less changes. Marked structural disruption was registered in the newly formed epithelium. The cells of the regenerated epithelium contained big granules of keratohyaline and the concentration of glycogen and ribonucleic acids was decreased under the influence of prednisone and hydrocortisone.

ACTH showed an analogous influence on the healing of wounds, but its effect was weaker than that of glucocorticoids. In rats, which were given ACTH, the granulation tissue was weak, particularly the superficial layer. The fatty tissue on the wound floor was hypertrophied, the layer of granulation tissue appeared to be thinner and consisting mainly of fibrous structures. In the deep layers of granulation tissue accumulations of fibres of various diameters were found which formed quite homogenous clusters. In this granulation tissue, developing under the influence of ACTH, no clear regularity as to the direction of the growing blood vessels could be ascertained. The epithelial stratum was thinned out both in the intact part adjoining the wound and in the regenerated part.

Regeneration of the skin cover after the administration of desoxycorticosterone acetate (DOCA), which — as is well known — is, unlike the glucocorticoids,

produced by the cells of the zona glomerulosa of the adrenal cortex functioning outside the control of hypophysial hormones, proceeds entirely differently. Under the influence of DOCA the granulation tissue actively proliferated to a considerable thickness on account not only of the increased number but also of the size of cells. The cellular elements of the granulation tissue were numerous and variform, but cells of the fibroblast order predominated. Apart from fibroblasts and fibrocytes, macrophages, histiocytes and, at the base of the granulation tissue, also fat cells were present. Under the influence of DOCA the young epithelium proliferated intensely. The epithelial wedge showed considerable width and height. The regenerated epithelium consisted of 10 to 12 layers of young cells and where it joined the intact zone, the number of layers reached 20. DOCA stimulated synthesis and accumulation of RND and glycogen in the newly formed young tissue.

Analogous results were obtained with the somatotrophic hormone or the hypophysis (STH). Under the influence of STH the granulation tissue, which filled the wound defect, showed the most exuberant development. Prevalent were horizontally orientated fibroblasts with fine collagenous fibres and amorphous masses lying between them. The granulation tissue was slightly infiltrated with leucocytes. The layer of horizontal fibroblasts was pierced in a vertical direction by multiple blood vessels surrounded by big but little differentiated cells. In the section of the old dermis, bordering the intact region, fat cells were found clustered mainly around blood vessels. Big, oval fat cells containing a great many granules were predominant.

Characteristic for the administration of STH was the obvious activation of regenerating epithelial cells. The cells of the young epithelium were of large size and irregular shape. Polarization, which is typical for the cells of the intact epithelium, was frequently upset. From the base of the epithelial wedge projections of various shape entered the underlying connective tissue. The epithelial cells were rich in glycogen and RNP. In the majority of animals, which had received STH, epithelization was completed 10 days after the infliction of the wound. Only in a small number of animals a minute area was not covered with young epithelium.

In animals, which had received thyroxine, the microscopic structure of the epithelium was quite characteristic. It ought to be noted that the layer of granulation tissue, which filled the wound defect, was particularly thick. The tissue was slightly infiltrated with leucocytes and contained many macrophages with a basophil cytoplasm, particularly in the superficial sections of the young tissue. In the deep layers a great number of various cells, fibroblasts, fibrocytes, histiocytes and fat cells was found. The granulation tissue of rats treated with thyroxine showed a decreased number of neutrophils; the few leucocytes, which could be found, showed various stages of disintegration, as a result of which glycogen granules of the neutrophil cytoplasm were found in the interstices of the granulation tissue.

The thick wedge of regenerated epithelium progressed between the layer of horizontally aligned fibroblasts and the thin scab. This wedge was of considerable

length, its basal surface was uneven because of the many projections jutting into the underlying connective tissue. The epithelial cells were rich in RNP and glycogen. Glycogen, as in the epithelium of animals of the other groups, was absent in the cells of the basal layer of both the regenerated and the intact epidermis.

It can, therefore, be concluded that each hormone, which we have used in the experiment, has its specific influence on the metabolism and differentiation of young cells participating in the reparative processes of the organism. One group of hormones (STH, DOCA, thyroxine) mainly activates proliferation of young tissues and thus creates conditions favourable to early epithelization of the wound surface and the healing of wounds. The other group (ACTH and glucocorticoids) stimulates differentiation. The premature ripening of cell elements represents a special break on the capacity of proliferation and growth of new tissue as a whole. All this together slows down the healing of wounds.

In previous papers we pointed out that the regenerative process develops in phases, and reported on the influence of various hormones on the differentiation of cells (5, 7, 9, 10). These observations have convinced us that hormones must be employed in combination with regard to the particular phase of the reparative process. In the early stages of regeneration we think it expedient to administer STH and DOCA, whereas in the final stage it is obvious to use hormones stimulating differentiation of cells, i. e. glucocorticoids and partly also hormones of the thyroid gland.

This is valid mainly for slowly healing wounds which require additional stimulating factors.

The features of graft taking and reparative regeneration are not identical. However, the degree of regenerative capacity of a tissue is not indifferent to its capacity to take as a transplant. It is well known that immunogenic processes do not proceed at all uniformly under the various changes of hormonal balance in the organism. Thus we should like to stress that the specific influence of hormones on proliferation and differentiation of tissue structures must be taken into account and competently used, even under conditions of experimental transplantation.

S U M M A R Y

The efficacy of auto- or homotransplantation depends on a number of factors connected both with the properties of the transplant and the physiological condition of the recipient whose hormonal balance is of dominant importance. The paper deals with the interaction found between the capacities of tissue to regenerate and to take to the new bed.

In experiments with rabbits, guinea pigs, puppies and white rats, the author studied the influence of two groups of hormonal preparations on the reparative processes in the skin. In experiments with white rats using histochemical methods for biopsy observations of the wound edges, the specific influence of various hormones on the processes of growth and differentiation of new tissue structures, were demonstrated. STH, DOCA and the hormone of the thyroid gland chiefly activate proliferation of cells and thus promote epithelization of the wound surface. ACTH and the various glucocorticoids, on the other hand, show an inhibi-

tory effect on the growth of granulation tissue and young epithelium, accelerating, at the same time, differentiation of various cell elements which together bring about retardation of the healing process as a whole.

Rational stimulation of healing with hormones should be carried out with due regard to the basic stages of the reparative process and by employing a combination of the various hormones.

R É S U M É

L'influence de différentes hormones sur le processus de régénération dans la peau

A. I. Boukhonova

L'efficacité de l'auto- ou de l'homéogreffe dépend de toute une série de facteurs, en rapport aussi bien avec les qualités du greffon qu'avec les conditions physiologiques du porte-greffe, dont l'équilibre hormonal est d'une importance de premier ordre. La communication présentée indique les interrelations mises en évidence entre les capacités régénératrices du tissu et sa faculté d'adhérer au lit nouveau.

Dans les expériences faites sur des lapins, des cobayes, des chiens et des rats blancs, l'auteur a étudié l'influence de deux groupes de préparations hormonales sur le processus réparateur de la peau. Dans des expériences faites sur des rats blancs et en utilisant des méthodes histochimiques pour l'étude bioptique des bords de la plaie, l'influence spécifique de différentes hormones sur le processus de la croissance et celui de la différenciation des structures tissulaires nouvelles a pu être démontrée. STH, DOCA et l'hormone thyroïdienne activent essentiellement la prolifération cellulaire, ce qui favorise l'épithélisation de la surface de la lésion. ACTH et les divers glycocorticoides montrent, au contraire, un effet inhibiteur sur la croissance et la granulation du tissu et de l'épithélium nouvellement constitué, tout en accélérant la différenciation de divers éléments cellulaires ce qui, dans son ensemble, retarde le processus de guérison tout entier.

Une stimulation rationnelle de la guérison à l'aide des hormones appropriées devrait être effectuée, tout en tenant compte des étapes de base du processus réparateur et en employant une combinaison appropriée des hormones diverses.

Z U S A M M E N F A S S U N G

Der Einfluss verschiedener Hormone auf die reparativen Vorgänge in der Haut

A. I. Buchonowa

Die Wirksamkeit einer Auto- oder Homotransplantation hängt von einer Reihe von Bedingungen ab, die sowohl mit den Eigenschaften des Transplantats, als auch mit dem physiologischen Zustand des Organismus zusammenhängen, wobei dem hormonalen Gleichgewicht des letzteren die Hauptbedeutung zukommt. Es wurde eine bestimmte Interferenz zwischen der reparativen Fähigkeit des Gewebes und seiner Adaptationsfähigkeit festgestellt.

Die Verfasserin führte Versuche an Kaninchen, Meerschweinchen, jungen Hunden und weissen Ratten durch und untersuchte den Einfluss zweier Gruppen von Hormonpräparaten auf die reparativen Vorgänge in der Haut. Die bioptische Untersuchung der Wundränder unter Verwendung histochemischer Methoden erwies in Versuchen an weissen Ratten, dass verschiedene Hormone einen spezifischen Einfluss auf Wachstum und Differenzierung der neuen Gewebestrukturen ausüben. STH, DOCA und das Schilddrüsenhormon fördern vor allem die Zellproliferation und damit auch die Epithelisierung der Wundflä-

che. ACTH und die verschiedenen Glukokortikoide üben hingegen einen hemmenden Einfluss auf das Wachstum des Granulationsgewebes und des jungen Epithels aus und beschleunigen dabei markant die vorzeitige Differenzierung verschiedener Zellelemente, was letzten Endes eine Hemmung des gesamten Wundheilprozesses zur Folge hat.

Eine rationelle Stimulierung mit Hilfe von Hormonen muss die Besonderheiten der Grundphasen des regenerativen Prozesses berücksichtigen und die verschiedenen Hormone nach Bedarf kombinieren.

RESUMEN

Influencias de varias hormonas sobre los procesos regenerativos de la piel

A. I. Bukhonova

La eficiencia de las auto- y homotransplantaciones depende de un número de factores conectados con las cualidades del transplante y la condición fisiológica de la persona recipiente cuya balanza hormonal posee una gran importancia. El trabajo se ocupa de la acción recíproca hallada en las capacidades del tejido de regenerar y aplicarse en el nuevo lecho.

Experimentando con los conejos, cobayas, perrillos y ratas blancas el autor estudiaba la influencia de dos grupos de los preparativos sobre los procesos reparativos en la piel. Al experimentar con las ratas blancas usando métodos histoquímicos para observaciones de biopsia de las márgenes heridas, la influencia específica de varias hormonas sobre el proceso del crecimiento y diferenciación de las nuevas estructuras tisulares fue demostrada. STH, DOCA y las hormonas de la glándula tiroides principalmente activan la proliferación de las células y de tal manera provocan la epitelización de la superficie dañada. ACTH y los varios glucocorticoides, de otra parte, muestran un efecto inhibitorio sobre el crecimiento del tejido de granulación y del nuevo epitelio, acelerando simultáneamente la diferenciación de varios elementos celulares que en conjunto causan una retardación del proceso curativo.

Le estimulación racional del proceso curativo con ayuda de las hormonas debería ser efectuado respecto a los estadios básicos del proceso reparativo empleando una combinación de las hormonas varias.

REFERENCES

1. Berlin, L. B.: Arkh. Anat. 8, 47, 1959.
2. Berlin, L. B.: Dokl. A. N. SSSR 1, 188, 1960.
3. Berlin, L. B., Nezdatny, M. M.: Dokl. A. N. SSSR 3, 706, 1961.
4. Bookhonova, A. I.: Probl. Endokrinol. 2, 9, 1958.
5. Bookhonova, A. I.: Dokl. A. N. SSSR 5, 1256, 1960.
6. Bookhonova, A. I.: Dokl. A. N. SSSR 6, 1406, 1962.
7. Vaynshteyn, V. G.: Plasty of Traumatic Skin Defects. Moscow 1946.
8. Voytkevitch, A. A.: Vestn. A. M. N. SSSR 2, 42, 1961.
9. Voytkevitch, A. A.: Problems of Con- temporary Endocrinology. V 2. p. 240, Moscow 1963.
10. Ruditsky, M. G.: Probl. Endokrinol. 4, 8, 1960.
11. Ruditsky, M. G., Beloglyadova, N. I.: Acta Chir. Plast. 4, 152, 1962.
12. Fallin, L. I.: Oospekhy Sovr. Biol. 2, 228, 1962.
13. Filatov, A. N., Beringher, Y. V., Golovin, G. V. et al.: Transplantation and Transposition of Tissues and Organs. Leningrad 1960.
14. Bradfield, J. R. G.: Nature 167, 40, 1951.
15. Firket, H.: Arch. Biol. (Liege) 62, 335, 1951.
16. Scothorne, R. J., Scothorne, A. W.: J. Anat. (London) 87, 22, 1953.

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TRANSFUSION OF BLOOD AND BLOOD SUBSTITUTES IN BURNS SHOCK

R. I. MOORAZYAN, L. I. GERASSIMOVA

Transfusion therapy plays a supreme role in the treatment of large and deep burns during the acute stage. In the presence of haemodynamic disorders many authors employ various fluids for transfusion starting with blood substitutes, antishock solutions and finishing with plasma or whole blood. In the treatment of burns shock much still remains controversial. So, for instance, it is uncertain in what types of burns it will be sufficient to use blood substitutes only, when it is expedient to use whole blood, how much fluid ought to be infused in the first 24 hours, what signs are to be regarded as the criteria for determining the procedure in transfusion therapy, etc.

In order to elucidate the particular features of transfusion therapy in burns shock, we carried out an analysis and made a summary of the result of our clinical observations in the years 1952 to 1962. During this period 1556 patients were treated at the burns unit of the Central Lenin Institute of Haematology and Blood Transfusion, 127 of whom had large and deep burns over an area of 30% and more of body surface and had been admitted to hospital in shock. Apart from the size of the injury the severe condition of 101 patients was due to the presence of deep 3-b to 4th degree burns, involving 10% or more of body surface. In the remaining 26 patients the size of the deep burns was between 3 and 9%. In 32 patients who were brought to hospital relatively soon (30 to 50 min.) after the accident, high arterial blood pressures were measured. In the remaining 95 patients, who were admitted 1 to 3 hours after the accident, arterial pressure was decreased. In 22 patients with burns over an area of 50% and more of body surface, most of which were deep burns, extremely low values of arterial pressure, corresponding to those found in traumatic shock of 3rd and 4th degree, were recorded.

Our procedure consists in refraining from surgical toilet in the first day and in immediately employing transfusion therapy together with other anti-shock measures. When the arterial blood pressure is raised or is normal we give infusions of fluids by drip. If the arterial pressure drops sharply the fluid is infused by continuous stream until the arterial pressure has been raised above

the critical level (75—80 mm. Hg); afterwards infusion is continued by drip. If intravenous infusion remains without effect we give small supercharges of blood or polyglucine intraarterially.

The problem as to how much fluid ought to be infused in a case of burns shock, is far from being solved. The various schemes and recommendations of the amount of fluid to be infused during 24 hours, up to 10 litres (Evans, Amspacher, Black, Harkins and others), prove little justified. The observations of our collaborators in the Institute (Fyodorov, Goorevitch, Skoorkovitch, Troytsky, Khokhlova) show that vascular tonus suffers little in large burns. At the same time, however, early and primary changes appear in the heart (manifest on radiography, ECG and in the changes of arterial and venous blood pressure). That is why we regard the infusion of only medium quantities of fluids as admissible (Groz dov, Shrayber, Pickrell, Crawford and others). It ought to be remembered that it is typical of burns shock that early signs of intoxication appear simultaneously with the haemodynamic disorders. Clinically, this is proved by the sharp rise of temperature, restlessness and severe dyspeptic disorders (nausea, vomiting, constipation) which, in large burns already become manifest at the end of the first 24 hours, and also by the increase in toxic substances in the blood plasma which can best be shown by the method of tissue culture (Koryakina). In the first hours after burns injury severe disruption of the water and electrolyte balance with a sharp rise in blood potassium, can be observed. Therefore, to combat not only the haemodynamic disorder but also the symptoms of intoxication, hyperkalaemia and of other disorders, a sufficient amount of transfusion fluids must be infused. In burns up to 50% of body surface we give 2 to 3.5 litres, in larger and particularly in deep burns up to 5 litres. Taking into account that severe disorders of haemodynamics and renal function develop within the first 8 to 10 hours after injury, we give half the daily dose of fluids during this period. The speed and quantity of fluid to be infused are determined 1. by the venous blood pressure, 2. by the ECG findings, 3. by the amount of urine obtained by catheter and measured hourly. A sharp rise in venous pressure (200 to 220 mm. H₂O) and an ECG showing cardiac decompensation require the lowering of the amount of fluids infused. In such cases it is expedient to use concentrated solutions of plasma, i.e. dried plasma mixed with a smaller volume of solvent. When urine excretion drops to less than 20 to 25 ml. per hour, the amount of fluid infused must be raised. When the amount of urine exceeds this, the rate of the infusion is lowered. In the overwhelming majority of cases we started transfusion therapy with polyglucine which had a marked haemodynamic effect, acting more quickly than blood transfusion (Groz dov, Agranenko, From, Moorazyan). It ought to be stated that blood concentration of polyglucine drops to 80—60% within one hour and to 50% within three hours, but afterwards decreases quickly; in view of this the infusion of polyglucine must be given uninterruptedly in order to achieve a positive haemodynamic effect. In this respect a combination of polyglucine with plasma or blood proved best. As emerges from our data, transfusion of whole blood even in large amounts (800—1500 ml.) does not lead to a marked increase

in blood density. During the period of shock, blood transfusion helps to lower the degree of hypoproteinaemia and anaemia which develop during the subsequent days of burns sickness. However, in high blood concentration (haemoglobin above 19 g. % erythrocytes 6.5 mil., viscosity over 8 and haematocrit more than 65) we have refrained from transfusing large amounts of blood. It is well to combine transfusion of polyglucine, blood or plasma with 10% glucose aimed at decreasing its depletion in the tissues and improving the function of the liver and the heart. As a rule a novocain solution was added to the transfusion. Patients with large burns (over 70%), in whom marked signs of intoxication were observed at the end of the first 24 hours, were given infusions of polyvinylpyrrolidone (300 ml.) which rapidly controlled or checked vomiting and increased urine output. In one patient with severe oliguria, after the administration of this drug, the amount of urine flowing out the catheter reached 200 ml. within half an hour. This detoxicating and particularly the diuretic effect can be explained by the increase in glomerular filtration and blood flow through the kidneys (From, Vinokoorova, Moorazyán). The results of transfusion therapy employed during the first stage of burns sickness are demonstrated in Tab. 1.

As can be seen from the figures in Tab. 1., infusion of only one type of solution, glucose, physiological saline or heteroprotein preparations, did not control shock in three out of 19 patients with burns over an area of 30 to 50% of body surface. During the drip infusion of heteroprotein preparations the majority of patients showed a drop in arterial blood pressure. Although infusion of antishock solutions together with glucose proved effective in burns of 30 to 49% of body surface, in injuries of 50% and larger, the efficacy of this kind of infusion was low [3 out of 7 patients died during the period of shock]. On the other hand, continuous infusions of polyglucine together with glucose and

Tab. 1

Substances infused	No. of pat. admitted with shock	Area of surface burned					
		30-49 %		50-69 %		70 % and more	
		died from shock	over-came shock	died from shock	over-came shock	died from shock	over-came shock
Blood and plasma together with polyglucine and glucose solutions	28	14		5		9	
Polyglucine with heteroprotein preparations	15	8		4		1	2
Polyglucine with glucose solutions	39	21		12		2	4
Antishock fluids plus glucose solutions	11	4		4	1		2
Heteroprotein solutions	21	9	2	4	2	2	2
Glucose solutions plus physiological saline	13	7	1	1	2		2
Total	127	63	3	30	5	14	12

Tab. 2

Death rate from shock in dependence on size and degree of burns

Total area burned in %	Area of deep burns (III ^o —IV ^o) in %				50 and more	Number of patients	Death rate from shock	
	3—9	10—19	20—29	30—49			number	percent
30—49	22	12	15	17(3)		66	3	4,5
50—69	4	7	14(4)	14(4)	2(1)	35	5	14,3
70 and more			2	8(3)	16(9)	26	12	46
Total	26	19	25	39(10)	18(10)	127	20	15,7

*) Number of patients who died from shock is given in brackets

heteroprotein preparations (BK-8, LSB, protein hydrolysates) led to 45 patients with burns of 30 to 70% of body surface overcoming shock. In burns of 70 and more percent even these infusions proved ineffective (6 out of 9 patients died during shock). The most effective proved to be blood and plasma transfusions combined with infusion of polyglucine and glucose. Out of 28 patients (9 of whom with burns of 70 and more percent) not a single one died from shock.

In burns larger than 50% of body surface, particularly in deep ones, the best results were achieved by a combination of protein (blood, plasma), colloidal (polyglucine) fluids and glucose solutions in equal parts. To the solutions of glucose, it is expedient to add 100 to 300 ml. of a 0.5% solution of novocaine. In the complex treatment of burns shock, vitamins of the "B" group (B₁, B₁₂, B₆) and ascorbic acid are of particular importance. Taking into account the changes developing in the blood coagulation system and the chance of thrombosis and embolism, 10,000 to 20,000 units of heparin were given to the patients as a daily prophylactic dose. During the first two days moistened oxygen was administered in each case. Since 1961, a series of patients received hormones, such as Prednison, Prednisolon, etc. In six patients in a state of motor agitation we used nitrous oxide plus oxygen in a ratio 1:1 or 2:1 by way of an anaesthetic apparatus (Roodayev, Gherassimova), which checked the restlessness and made breathing regular. The positive results observed clinically found their objective expression in the registration of the metabolimeter. A decrease in the minute volume and oxygen depletion of the organism were ascertained (Ulenbrook method). The basal metabolism was reduced by 10 to 20%.

During the period of shock, all patients received cardiotonics and antibiotics intravenously (via the rubber tubes of the transfusion set). Appraising the results of the treatment of burns shock, we can state that 20 out of 127 patients with 30% or more of body surface burned and suffering from severe burns shock (i. e. 15.7%), died from shock, of those with 30 to 49% 3 out of 66 (i. e. 4.5%),

with 50 to 69% out of 55 (i. e. 22%). This highest death rate during the period of shock was found in patients with burns of 70% and more of body surface, i. e. 12 out of 26 (46%). In Tab. 2. an analysis is made of the patients who died from shock in relation to the size and degree of the burns. The numbers registered there do not exceed those published by Soviet or foreign authors [Vilyavin, Artz, Reiss]. It is noteworthy that not only the total area of the burned surface but also the area of deep burns had an influence on the results of treatment during the period of shock. So, for instance, in all patients who died from shock the area of deep burns amounted to 30% and more. That is why blood transfusion and the entire complex of antishock measures must be employed in a case where the whole area burned, though measuring only 30 to 40%, consists of deep burns.

On the basis of our clinical data about the treatment of burns shock it is possible to come to the following conclusions:

1. In the treatment of shock from large and deep burns the supreme role is played by transfusion therapy.

2. The amount of fluid to be infused varies and depends on the severity of the injury. In burns not larger than 50% of body surface it should not exceed 2.5 to 3 litres, in larger burns 5 litres in 24 hours.

3. Taking into account the danger of heart failure which develops quite early, the total amount of fluid and the rate by which it is infused should be regulated under constant observance of the arterial and particularly of the venous blood pressure, the ECG, the pulse (its frequency and volume) and other clinical signs indicating the degree to which the function of the cardiovascular system has been affected.

4. In burns not larger than 50% of body surface the addition of saline antishock narcotics to the solutions of glucose prevents death from shock.

5. In burns up to 70% of body surface infusion of polyglucine together with solutions of glucose or heteroprotein preparations enables the patient to overcome shock.

6. In burns of 70% of body surface and larger, the most effective means of combating shock proved to be transfusion of blood or plasma together with polyglucine, glucose and novocaine.

S U M M A R Y

The paper gives an analysis of the methods of transfusion therapy in burns shock of 127 patients with deep burns of 30 and more percent of body surface.

On the basis of the results achieved the authors point out the expediency in using whole blood in the treatment of burns shock. In burns not larger than 50% of body surface it is justified to use antishock fluids and glucose solutions. In larger burns (up to 70%) infusion of polyglucine together with heteroprotein preparations or glucose resulted in all patients overcoming shock. In burns of 70% and larger the most effective means of combating shock were blood and plasma transfusions combined with infusions of polyglucine, solutions of glucose and novocaine.

R É S U M É

Transfusion de sang ou de ses substituts pendant l'état de choc à la suite de brûlures

R. I. Murazjan, L. I. Gerasimova

La communication présente une analyse des méthodes de la thérapie par transfusion des chocs après brûlures, effectuée sur 127 malades atteints de brûlures profondes, d'une étendue de 30% ou plus de la surface totale du corps.

A base des résultats obtenus, les auteurs soulignent l'efficacité de l'utilisation de sang complet pour la thérapie des chocs après brûlures. Si les brûlures ne couvrent pas plus que 50% de la surface totale du corps, il est indiqué d'utiliser des liquides antichoc et des solutions de glucose. Si l'étendue des brûlures est plus grande (au-dessus de 70%), une infusion de polyglucine, combinée à des préparations d'hétéroprotéine avait pour résultat que tous les malades ont réchappé du choc. Si l'étendue des brûlures dépasse 70%, le traitement le plus efficace pour combattre le choc consiste dans des transfusions sanguines et plasmatiques, combinées à des infusions de polyglycine, de solutions de glucose et de novocaïne.

Z U S A M M E N F A S S U N G

Die Taktik der Behandlung des Schocks bei Verbrennungen mit Transfusionen

R. I. Murasjan, L. I. Gerasimowa

In der vorliegenden Arbeit wird eine Analyse der Behandlungsmethoden des Schocks bei Verbrennungen mit Blutübertragungen anhand von 127 Patienten vorgenommen. Die Patienten wiesen schwere Verbrennungen auf, die 30 und mehr Prozent der Körperoberfläche betrafen.

Auf Grund der erzielten Ergebnisse betonen die Verfasser die Zweckmässigkeit der Applikation von Gesamtblut bei der Behandlung des Schocks bei Verbrennungen. Betrifft die Verbrennung bis zu 50 Prozent der Körperoberfläche, ist die Anwendung von schockbekämpfenden Flüssigkeiten und Glukoselosungen gerechtfertigt. Bei ausgedehnteren Traumen (die bis zu 70 Prozent der Körperoberfläche betreffen) gestatteten Infusionen von Polyglukin zusammen mit Hetero-Eiweisspräparaten oder Glukoselosungen, sämtliche Patienten über das Stadium des Schocks zu bringen. Bei Verbrennung von 70 und mehr Prozent der Körperoberfläche erwiesen sich Blut- und Plasmatransfusionen zusammen mit Polyglukin, Glukose- und Novokainlösungen als die wirksamsten Schockbekämpfungsmittel.

R E S U M E N

La transfusión de sangre y los substitutos de sangre en el shock en quemaduras

R. I. Murazyán, L. I. Guerasimova

Este trabajo presenta un análisis de los métodos en la terapéutica de transfusión en el shock en quemaduras en el grupo de 127 pacientes con quemaduras profundas cubriendo el 30% y el porcentaje más alto de la superficie del cuerpo humano.

En la base de los resultados adquiridos los autores llaman la atención a la conveniencia y aprovechamiento de emplear sólo la sangre en el tratamiento del shock en quemaduras. En quemaduras que cubren menos del 50% de la superficie del cuerpo

se pueden usar con justicia flúidos de antishock y soluciones de glucosa. En quemaduras más extensas (hasta el 70%) la infusión de poliglucinio en conjunto con preparaciones de heteroproteína o glucosa ayudaron a los pacientes de superar el shock. En quemaduras que cubren el 70% o zonas más extensas los medios más eficaces que resisten el shock eran transfusiones de sangre y plasma combinadas con infusiones de poliglucinio, soluciones de glucosa y novocaína.

REFERENCES

1. **Vilyavin, G. D.:** Contribution to the Study of the Problem of Clinical Characteristics, Prevention and Treatment of Burns Shock; published in the papers read at the National Session dedicated to the memory of I. I. Djanelidze, Leningrad 1960.
2. **Grozdov D. M., Agranenko, V. A., From, A. A., Moorazyan, R. I.:** *Khirurgia* (Moscow) 7, 1957.
3. **Grozdov, D. M.:** *Khirurgia* (Moscow) 3, 1961.
4. **Goorevitch, I. B., Skoorkovitch, S. V., Khokhlova, M. P.:** *Pato-Fiziol. eksper. Ter.* 3, 1, 1959.
5. **Koryakina, I. K., Skoorkovitch, S. V., Fyodorov, N. A.:** *Patofiziol. eksper. Ter.* 5, 1960.
6. **Smidovitch, V. N., Gherassimova, L. I.:** *Khirurgia* (Moscow) 5, 1960.
7. **From, A. A., Moorazyan, R. I., Vinokurova, G. P.:** Efficacy of the Use of Low-molecular Polyvinylpyrrolidone in the Treatment of the Toxic Stage of Burns Sickness. Main ideas of paper read at the 40th Plenary Scientific Council of TSOLIPK,*] Moscow 1961.
8. **Shrayber, M. I., Dolghina, M. I.:** Treatment of Patients with Thermic Burns in the Vishnevsky Surgery Institute. Papers of the Kirov Military Academy, V 114, p. 76—82, 1960.
9. **Amspacher, N.:** *Surg. Chir. N. Amer.* 36, 5, p. 1385—1394, 1956.
10. **Artz, C. P., Reiss, E.:** *The Treatment of Burns.* Philadelphia-London 1957.
11. **Black, D. A. K.:** *Brit. med. J.* 2, 1940.
12. **Evans, E.:** *Arch. Surg.* 62, 3, 1951.
13. **Harkins, H. N., Cope, O., Evans, E.:** *J. Amer. med. Ass.* 128, 7, 475, 1945.
14. **Pickrell, K., Georgiade, N., Crawford, H.:** *Postgr. Spec.* 20, 1, 26—40, 1956.

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VITAL ACTIVITY OF THE EXCISED UTERUS AND ITS APPENDAGES AFTER THEIR AUTOTRANSPLANTATION INTO OMENTUM*)

Experimental Research

I. F. ZHORDANIA O. A. GOTSIRIDZE

Transplantation of organs is one of the most pressing medical problems, the successful solving of which would open great possibilities in the struggle against many pathological conditions of man. Many research workers have performed transplantation of some parts of the sexual apparatus experimentally and in clinical practice in cases of sterility and also of some abnormalities in endocrine functions. Transplantation of ovaries was performed experimentally by Grigoriev (1897), Sidorov (1927), Abuladze (1953) and by many others, and under clinical conditions, by Bogoraz (1940, 1949), Gnilorybov (1956) and others. Many research workers, for instance, Gorizontov in 1934, Schultze (1961) and others, tried implantation of the tubes into the uterus, but free transplantation was almost never tried by anyone. We succeeded in finding only one work of this kind in the literature (by Kakushkin in 1929) and described as a failure.

Only one work is known on the transplantation of the uterus, that by Bykov (1926). The author resected the horns of the uterus of dogs at the vagina and ligated the arteries supplying the uterus at the base of the ovaries, after which he wrapped the uterus into the omentum. Necrosis of the uterus did not result.

No work on transplantation of the uterus with its appendages could be found either in home or foreign sources.

Since 1959 one of the authors (O. A. Gotsiridze) has been performing cross autotransplantation of portions of the Fallopian tubes, using atraumatic suture techniques. To revascularize the autotransplanted parts of the tubes we have used the omentum. Out of five two ewes thus operated (10 operations) got pregnant, one aborted and the other had a normal delivery.

*) Presented to the IV World Congress on Fertility and Sterility in Rio-de-Janeiro (Brazil) on Aug. 12. 1962 and conferred an Honorary Diploma.

During the same period we have been experimenting in autotransplantation of the uterus with its appendages. Guided by the teaching on the peripheral circulation (Kirillov — 1960, Beck — 1960 and others) and also by our own experience in the problem of the surgical regulation of the local circulation in the genitals (Gotsiridze in 1959—1963; Zhordania in 1961—1963; Gvertsiteli in 1962; Khechinashvili in 1962 and others), we used the omentum as a revasculator



Fig. 1. Scheme of autotransplantation of the uterus and its appendages into omentum.

of the transplanted tissues. One of us (Gotsiridze) studied this question on the ovaries, tubes and uterus of pubescent and not yet completely matured animals, and also during the period of post-natal involution of the uterus. The other (Zhordania) investigated this problem in ovaries at the stage of decline or already declined functional activity.

METHODS AND MATERIALS

Twenty bitches, ten female rabbits and sixteen ewes were investigated. Twenty out of the total number of animals had never reproduced, and the rest, twenty-six, had offsprings. The dogs were between three and ten years of age, the rabbits, between one and three, and the ewes were between two and five years of age.

TECHNIQUE OF THE OPERATION OF AUTOTRANSPLANTATION OF THE UTERUS AND ITS APPENDAGES INTO THE OMENTUM

After laparotomy, the larger blood vessels feeding the uterus and its appendages (arteria uterina and arteria spermatica interna) were cut between two ligatures. Provisional stitches were laid on the mesouterus, mesosalpinx and mesovarium, after which the uterus together with the tubes and the ovaries was excised ("panhysterectomy"). The excised internal genitalia were removed from the abdominal cavity: in fifteen — forty-five minutes the abdominal tissue was

in some parts scraped off or the internal genitalia were incised and powdered with a thin layer of talcum powder, asbestos, bone or streptomycin. After having been thus treated the tissue was placed into the omentum and fixed to it by a number of knotted sutures by means of atraumatic needles (Fig. 1) (in dogs and ewes — АККН — 40, АККН — 30, in rabbits — АТН — 10—00) in such a way that the omentum did not cover the external layer of the ovary. The distal end of the uterus (in dogs and rabbits) was brought to the proximal surface of the abdomen and the "suspension of uterostamia" was created. The uterine cavity was drained by means of a polyethylene tube to prevent hydrometria and pyometria. All the ewes and some of the dogs had their internal genitalia sutured to the bottom of the pelvis, restoring continuity with the cervix of the uterus. Thus, the transplanted tissues were wrapped into the omentum. The dogs were operated on under the thiopental or intubation intratracheal etheroxygen anaesthesia, and the ewes and rabbits under the ether-inhalation. Prior to being anaesthetized the dogs and the ewes were given a hypodermic injection of a 1% solution of morphine hydrochloride, 1 ml. per kilogram of the weight.

Prior to the transplantation of the internal genitalia into the omentum, independent contractions of the uterus were registered according to the Magnus-Kerer-Knauss' method. For histological study, a 0.5 cm. length of the uterine horn was taken. The operated animals were under observation from one to twenty-four months. Determination of the presence of the omento-organic anastomoses was made by introducing a 1% solution of methylene blue into the thoracic aorta under slight pressure. The implanted internal genitalia were removed from the animal's organism (the dogs' and the rabbits') in 1—750 days after the operation and were subjected to anatomical and histological examination. In addition, the contractions of the incised horns of the uterus were also recorded. Six ewes were subjected to the operation of relaparotomy after their reproductive functions had been studied. Ten ewes were not subjected to relaparotomy and were left for further investigations.

RESULTS OF THE EXPERIMENTS

The excision of the internal genitalia and their reimplantation into the omentum did not appear to cause any complications in the animals subjected to the operation. During the entire period of the observation, beginning from the second and until the seven hundred and fiftieth day after the operation, the animals had a good appetite, they did not lose weight and their behaviour did not differ from that of animals which had not undergone the operation. At relaparotomy, no endometriosis, spontaneous peritoneal inflammation of the ovaries, breaking up of sutures etc. were registered.

Already within 3—7 days after the operation the passing of coloured fluid through the vessels of the omentum into the uterine tissue as well as into that of the ovaries and tubes was noted. When the transplanted parts were cut in two, the colour was observed on the entire area of the section. Observation through the operation microscope revealed and traced the movement of the coloured fluid through the whole vascular network of the transplanted organ.

Tab. 1. Division of operated ewes according to the time of becoming pregnant after of the

No.	No. of ewes experimented upon	No. acc. to operation register	Date of operation	Date of admission of sires into flock	Getting pregnant after operation
1	A-207	2/54	May 4, 1960	August, 1960	barrenness (1960)
2	B-617	2/55	May 5, 1960	Aug., 1960&1961	pregnancy (1960)
3	U-9-771/PO-7007	2/63	May 5, 1960	Aug., 1960&1961	pregnancy (1960)
4	A-605/P-7097	2/56	May 5, 1960	August, 1960	barrenness (1960)
5	D-551/-9-799	2/57	May 5, 1960	August, 1960 & 1961	pregnancy (1960)
6	Ž-348/PO-7013	2/60	May 5, 1960	August, 1960	pregnancy (1960)
7	U-9-763/YX-759	2/62	May 5, 1960	August, 1960	barrenness (1960)
8	A-450	2/58	May 5, 1960	August, 1960	pregnancy (1960)
9	D-402	2/61	May 5, 1960	August, 1960&1961	pregnancy (1960)
10	L-40	2/59	May 5, 1960	Aug., 1960&1961	pregnancy (1960)
11	PX-1203	2/201	May 7, 1961	Aug., 1961	pregnancy (1960)
12	PO-7031	2/213	May 9, 1961	—	—
13	PO-7047	2/205	May 8, 1961	August, 1961	pregnancy (1961)
14	PX-1212	2/212	May 9, 1961	August, 1961	pregnancy (1961)
15	PO-7040	2/203	May 8, 1961	August, 1961	barrenness (1961)
16	PO-7014	2/204	May 8, 1961	August, 1961	barrenness (1961)
					TOTAL

In a year after the autotransplantation of the uterus with its appendages, when the internal genitalia were connected with the organism only through the omentum fixed to them, wounds inflicted on the transplanted organ caused severe arterial bleeding, which testifies to the fact that a new powerful vascular system had been developed from the vessels of the omentum.

In two weeks after the autotransplantation the internal genitalia already had a normal external appearance, colour and elasticity (macropreparations

autotransplantation of the uterus and its appendages into omentum considering results pregnancies

Result of the pregnancy		Repeated pregnancy	Result of the repeated pregnancy		Notes
Deliv.	Abort.		Deliv.	Abort.	
—	—	—	—	—	The experiment was over in May, 1961
—	+	pregnancy (1961)	+	—	The experiment was over in May, 1962
+	—	pregnancy (1961)	+	—	Relaparotomy: examination of the organs of the abdominal cavity (May, 1961) The experiment was over in May, 1962.
—	—	—	—	—	Relaparotomy: panhysterectomy. The experiment was completed in May, 1961
+	—	pregnancy (1961)	+	—	Relaparotomy: examination of the organs of the abdominal cavity (May, 1961) The experiment was completed in May, 1962.
+	—	—	—	—	Relaparotomy: examination of the organs of the abdominal cavity (May, 1961) The experiment was completed in May, 1961.
—	—	—	—	—	Relaparotomy: examination of the organs of the abdominal cavity (May, 1961) The experiment was completed in May, 1961.
+	—	—	—	—	The experiment was completed in May, 1961.
+	—	barrenness (1961)	—	—	The experiment was completed in May, 1962.
+	—	barrenness (1961)	—	—	Relaparotomy: panhysterectomy (May, 1961). The ewe was preserved for control until May, 1962.
+	—	—	—	—	Death caused by asphyxia in 18 hours after the operation (May, 1961)
—	—	—	—	—	The experiment was completed in May, 1962.
+	—	—	—	—	The experiment was completed in May, 1962.
+	—	—	—	—	The experiment was completed in May, 1962.
—	—	—	—	—	The experiment was completed in May, 1962.
—	—	—	—	—	The experiment was completed in May, 1962.
9	1		3	—	

NN 1, 5, 7, 8, 9, 11, 19 and others). The erectile ability of the uterus was also preserved.

Histological study of the uterine and ovarian tissues on the first day after the operation revealed atrophy of the transplanted parts, in which regenerative processes quickly started, and already by the thirtieth day the histostructure of the tissues of the internal genitalia resumed its initial normal state, which was maintained during the whole period of the observation (Figs. 2, 3, 4).

Study of the ability of the transplanted uterus to contract on the fourth day after the operation revealed decrease in tone and disorder in the rhythm of its contractions (Fig. 5). By the forty-fifth day the contractile power was normal, and in a year after the transplantation it had a very rhythmical character (Fig. 6).

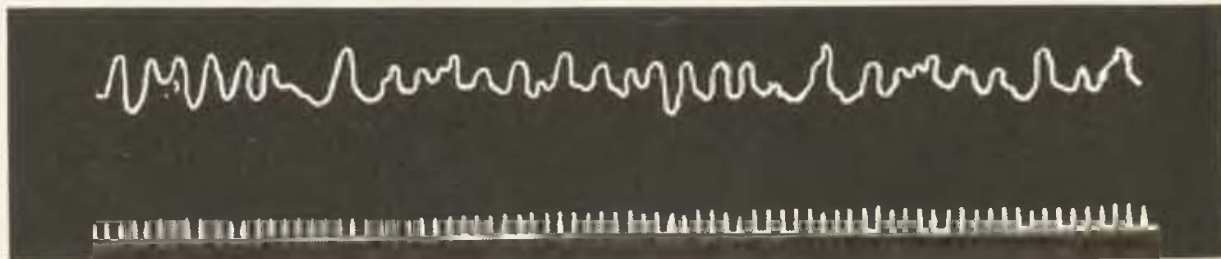


Fig. 5. Independent contractions of isolated horns of the uterus of dog on the fourth day after excision and omentization of the uterus and its appendages (slowly rotating drum of electromyograph).

Sixteen of the ewes which had undergone the operation were mated with 60 % of pregnancies, resulting in normal deliveries of living lambs at term (Tab. 1). Lactation was normal in all cases.

In this way, the revascularization of the transplanted internal genitalia by their omentization in our experiments preserved the vital activity of the uterus and its appendages, completely exsanguinated and denervated. This may presumably be explained by the penetration of the fibres of nerves together with newly created vascular anastomoses from the omentum into the tissues of the transplanted organs.

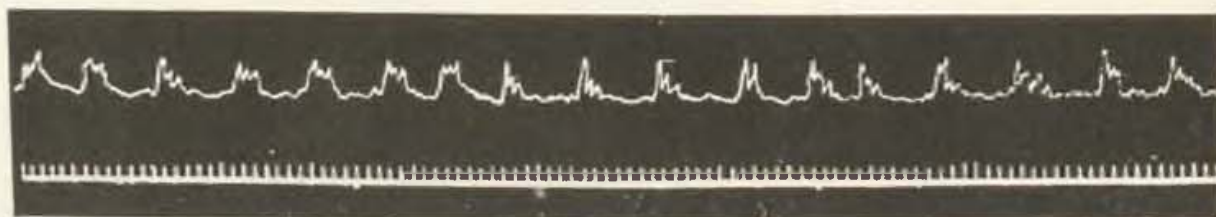


Fig. 6. Strictly rhythmical independent contractions of isolated horns of the uterus of dog on the 368th day after excision and omentization of the uterus (slowly rotating).

Analysis of the results of the experiments permits us to make the following conclusions:

1. Autotransplantation of the uterus and its appendages into the omentum does not cause any complications in the animals experimented upon.
2. On the 3rd — 7th day after the transplantation of the internal genitalia into the omentum the blood vessels of the latter grew through into the uterus and its appendages.

3. Growing of the blood vessels through into the transplanted genitalia supplied their normal nutritional requirements.

4. Revascularization of the transplanted internal genitalia by omentization preserved their normal morphological structure, vegetohormonal and reproductive functions.

5. Omentization of the excised internal genitalia enables us to plan new possibilities for successful investigation of the problem of transplantation of the uterus and its appendages.

SUMMARY

In twenty bitches, ten female rabbits and sixteen ewes the internal genitalia — the uterus, the Fallopian tubes, the ovaries, the mesouterus, the mesosalpinx and the mesovarium — were excised. Fifteen — forty-five minutes after this they were reimplanted into the omentum of the same animal.

On the third — seventh day after the experiment the vessels of the omentum grew through into the exsanguinated genitalia, preserving the vital activity of the latter throughout the period of observation (two years). The normal histological structure of the uterus and the ovaries, the independent rhythmical power to contract, ability of the animal to conceive and bear, normal delivery, lactation, etc., being preserved at the same time.

The facts resulting from the experiments give favourable prospects for revascularization of an absolutely exsanguinated uterus and its appendages, and for the further study of the problem of transplantation of internal genitalia.

RÉSUMÉ

L'activité vitale de l'utérus excisé et de ses annexes après autogreffe dans l'épiploon

I. F. Zhordania, O. A. Gotsiridze

Les organes génitaux — l'utérus, la trompe utérine, les ovaires, le méso-utérus, le mésosalpinx et les méso-ovaires ont été excisés sur 20 chiennes, 10 lapins et 16 brebis. Dans un délai de 15—45 minutes, ils ont été implantés dans l'épiploon du même animal.

Entre le troisième et le 7^{ème} jour après cette intervention, les vaisseaux de l'épiploon se sont développés de façon à atteindre les génitaux exsanguinés, ce qui leur a permis de conserver leur activité vitale pendant toute la période d'observation (deux années). Une structure histologique normale de l'utérus et des ovaires, la faculté d'effectuer des contractions rythmiques indépendantes, la capacité des animaux d'être fécondés et de mettre bas normalement, ainsi que celle d'une lactation normale etc. ont été également conservées pendant toute cette période.

Les faits rapportés en tant que résultats des expériences en question ouvrent des perspectives encourageantes en ce qui concerne la revascularisation d'un utérus absolument exsanguiné, aussi bien que ses annexes et également par rapport aux études futures du problème des greffes des organes génitaux.

ZUSAMMENFASSUNG

Die Lebensfähigkeit der ektomierten Gebärmutter und ihrer Adnexe nach Autotransplantation ins Omentum

I. F. Shordania, O. A. Gotsiridse

Weiblichen Versuchstieren (20 Hunden, 10 Kaninchen und 16 Schafen) wurden die inneren Geschlechtsorgane entfernt und zwar Gebärmutter, Eileiter, Eierstöcke, Mesometrium, Mesosalpinx und Mesovarium. Diese Organe wurden 15 bis 45 Minuten nach der Entnahme ins Omentum desselben Versuchstieres reimplantiert.

Innerhalb 3 bis 7 Tage nach der Transplantation drangen die Gefäße des Omentums in die von der Blutversorgung abgeschnittenen inneren Geschlechtsorgane ein, was zur Folge hatte, dass diese während der ganzen weiteren Beobachtungsperiode (bis zu zwei Jahren) ihre Lebensfähigkeit behielten. Dabei blieb die normale histologische Struktur des Uterus und der Ovarien erhalten, ebenso die selbständigen rhythmischen Uteruskontraktionen, die Befähigung zur Konzeption und zum Austragen der Schwangerschaft, zu normalen Entbindungen, Laktation u. s. w.

Die Versuchsergebnisse weisen auf die günstigen Perspektiven einer Revaskularisierung der von jeglicher Blutzufuhr abgeschnittenen Gebärmutter und ihrer Adnexe sowie auf die Möglichkeit hin, das Problem der Transplantation der inneren Geschlechtsorgane erfolgreich zu bearbeiten.

RESUMEN

La actividad vital del útero extirpado y sus pertenencias después de su autotransplatación en el omento

I. F. Zhordania, O. A. Gotsiridze

Veinte perras, diez conejos del sexo femenino y dieciséis ovejas tuvieron extirpados sus intergenitales, es decir, el útero, los conductos de Fallop, los ovarios, el mesoútero, el mesosalpinx y el mesovario. Dentro de quince minutos, cuarenta y cinco después de esta intervención, ellos fueron replantados en el omento del mismo animal.

El tercer día, el séptimo día después del experimento, los vasos del omento crecieron a través de los genitales exsanguificados, lo que preservó la actividad vital de ellos durante todo el periodo de la observación (2 años). La estructura histológica normal del útero y de los ovarios, su capacidad rítmica independiente de contraer, la capacidad del animal de poder concebir y llevar el feto, el parto normal, la lactación, etc., todo esto fue preservado simultáneamente.

El resultado de los experimentos ofrecen perspectivas favorables para la revascularización de un útero y sus pertenencias absolutamente exsanguificados y para poder estudiar este problema en el futuro, es decir, el estudio de transplatación de los intergenitales.

REFERENCES

1. Abuladze, A. V.: Proc. Acad. Sci. (USSR) Biological Series, 5, 39—54, 1953.
2. Beck, C. S.: Vestn. Chir. im. I. I. Grekova 34, 1, 7—19, 1960.
3. Bykov, S. G.: Kazan Med. J. 5—6, 680—684, 1926.
4. Bogoraz, N. A.: Restoration Surgery. — Rossizdat, Rostov-on-Don 1940; Medgiz, Moskva 1, II, 1949.
5. Gvertseli, A. P.: Methods of Autotransplantation of Ovaries. — Collection of Theses of the 3rd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR, dedicated to the memory of M. V. Lomonosov. Tbilisi 1962, p. 84—85.

6. **Gnilorybov, T. B.:** Vestn. Acad. Med. Sci. (USSR) 2, 35—42, 1956.
7. **Gorizontov, I. I.:** J. Obstet. gynaec. Dis. 14, 5, 298—308, 1934.
8. **Gotsiridze, O. A.:** Way to Increase Circulation of Blood in Internal Genitalia in Experiments. — Collection of Theses of the 1st Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR. Tbilisi 1959, p. 54—55. In the book "Childless Marriage"; under the editorship of Prof. I. F. Zhordania (Proc. of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR). Tbilisi 1960, I, p. 375—387.
9. **Gotsiridze, O. A.:** Experimental Foundation of the Operation of Omentotestopexy as a Method of a Supplementary Vascularization and Reactivation of Functional Activity of Testes. Experimental Research for Methods of Rejuvenation of an Aging Male Organism. — Collection of Theses of the 2nd Meeting on the Problems of Gerontology and Geriatrics. Published by the Moscow Society of Naturalists. Moscow 1960, p. 40—41.
10. **Gotsiridze, O. A.:** Artificial Increase of Circulation of Blood in Internal Genitalia as a Method of Elimination of Some Forms of their Pathology. — Collection of Theses of the 2nd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the 40th Anniversary of the establishment of the Soviet Power in Georgia; Tbilisi 1961, p. 90—91.
11. **Gotsiridze, O. A.:** Revascularization of Female Internal Genitalia as a Way of Combating Some Kinds of Obstetrical-Gynaecological Pathology (experimental research). — Collection of Theses of the First Scientific Conference of Obstetricians and Gynaecologists of the Georgian SSR. Tbilisi 1961, p. 82—83.
12. **Gotsiridze, O. A.:** Creation of Peripheral and Supplementary Circulation of Blood in Testicles under Various Conditions of Experiment. — Collection of Theses of the First Conference of Urologists of the Georgian SSR; dedicated to the 40th Anniversary of the establishment of the Soviet Power in Georgia. Tbilisi 1961, p. 203—204.
13. **Gotsiridze, O. A.:** Revascularization of Testes in Experiment. — Collection of Theses of the 3rd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the memory of M. V. Lomonosov. Tbilisi 1962, p. 87—87.
14. **Gotsiridze, O. A.:** New Methods of Surgical Treatment of Insufficient Blood Supply to the Male Sexual Glands. (Experimental Research.) — In the book "Creation of Organ Anastomoses in Experiment and in Clinical Practice". (Sci. Proc. of the Ryazan Med. Institute after Acad. I. P. Pavlov. Ryazan 1962, vol. XIII, p. 240—245.)
15. **Gotsiridze, O. A.:** Functional Activity of the Uterus and Its Appendages after Omentopexy. — Collection of Theses of the 3rd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the memory of M. V. Lomonosov. Tbilisi 1962, P. 84—84.
16. **Grigoriev, V. G.:** The Question of Transplantation of Ovaries. St. Petersburg, 1897.
17. **Zhordania, I. F.:** Obstet. Gynaec. (USSR) 2, 56—60, 1961.
18. **Zhordania, I. F.:** Perspectives of Development of Surgical Treatment of Some Kinds of Gynaecological Pathology in Women. — Collection of Theses of the 2nd Scientific Session of the Scientific Research Institute for Physiology and

- Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the 40th Anniversary of the establishment of the Soviet Power in Georgia. Tbilisi 1961, P. 89—90.
19. **Zhordania, I. F.:** Reinvigoration of the Functional Activity of Ovaries as Result of Artificial Increase of their Blood Supply. (On the Question of Prolongation of the Period of Sexual Activity with Women.) — Collection of Theses of the Scientific Research Institute of Gerontology and Experimental Pathology of the Academy of Medical Sciences of the USSR, Kiev 1961, p. 52—52.
 20. **Zhordania, I. F.:** Is the Decayed Genital Function in Women Reversible? — Collection of Theses of the 3rd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the memory of M. V. Lomonosov. Tbilisi 1962, p. 83—83.
 21. **Zhordania, I. F., Gotsiridze, O. A.:** Vital Activity of the Excised Uterus and Its Appendages after their Autotransplantation into Omentum. — Collection of Theses of the 2nd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the 40th Anniversary of the establishment of the Soviet Power in Georgia. Tbilisi 1961, P. 93—94.
 22. **Zhordania, I. F., Gotsiridze, O. A.:** Vital Activity of Excised Internal Genitalia Implanted into the Omentum. — Collection of Theses of the 3rd Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the memory of M. V. Lomonosov. Tbilisi 1962, p. 85—85.
 23. **Zhordania, I. F., Gotsiridze, O. A.:** Creation of Organic Collateral Blood Supply of the Uterus and its Appendages as a Method of Surgical Treatment of Some Kind of Gynaecological Pathology. — (Clinical Experimental Research.) — In the book "Creation of Organic Anastomoses in Experiment and in Clinical Practice" (Sci. Proc. of the Ryazan Med. Institute after Acad. I. P. Pavlov; Ryazan, vol. XIII, 1962, p. 234—239).
 24. **Zhordania, I. F., Gotsiridze, O. A.:** Autotransplantation of the Uterus and its Appendages. — In the book Creation of Organic Anastomoses in Experiment and in Clinical Practice. (Sci. Proc. of the Ryazan Med. Institute after Acad. I. P. Pavlov; Ryazan, vol. XIII, 1962, p. 250—254.)
 25. **Kakushkin, N. M.:** Gynaec. Obstet. 3, 259—273, 1929.
 26. **Kirillov, B. P.:** Creation of Supplementary Peripheral Circulation in, Experiment and in Clinical Practice. Moskva, Medgiz 1960.
 27. **Sidorov, P. P.:** Transplantation of Ovaries. Rostov-on-Don 1927.
 28. **Schultze, W.:** Die Tuboanastomose, als Sterilitätoperation. — Proc. of the Third World Congress on Fertility and Sterility. Amsterdam, London, New York 1961, p. 725—726.
 29. **Khechinashvili, N. N.:** Vital Activity of a Pregnant Uterus and Its Appendages in Relation to Ligature of the Large Afferent Blood Vessels. — Collection of Theses of the Third Scientific Session of the Scientific Research Institute for Physiology and Pathology of Woman; under the Ministry of Health of the Georgian SSR; dedicated to the memory of M. V. Lomonosov. Tbilisi 1962, p. 86—86.
 30. **Khechinashvili, N. N.:** Revascularization of a Pregnant Uterus According to the Method of Omentization. — In the book "Creation of Organic Anastomoses in Experiment and in Clinical Practice" (Sci. Proc. of the Ryazan Med. Institute after Acad. I. P. Pavlov. Ryazan, vol. XIII, 1962, p. 246—249).

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VITAL ACTIVITY OF THE EXCISED UTERUS AND ITS APPENDAGES
AFTER THEIR AUTOTRANSPLANTATION INTO OMENTUM



Fig. 2. Histological structure of the uterus thirty days after its excision together with the appendages and reimplantation into the omentum on the same animal. Normal development of all the layers of the uterus is seen (stained by haematoxylin-eosin).



Fig. 3. Histological structure of the uterus transplanted into omentum a year after the autotransplantation. Normal development of all the layers of the uterus is seen, especially of the mucous; the vessels are filled with Indian ink (stained by haematoxylin-eosin).

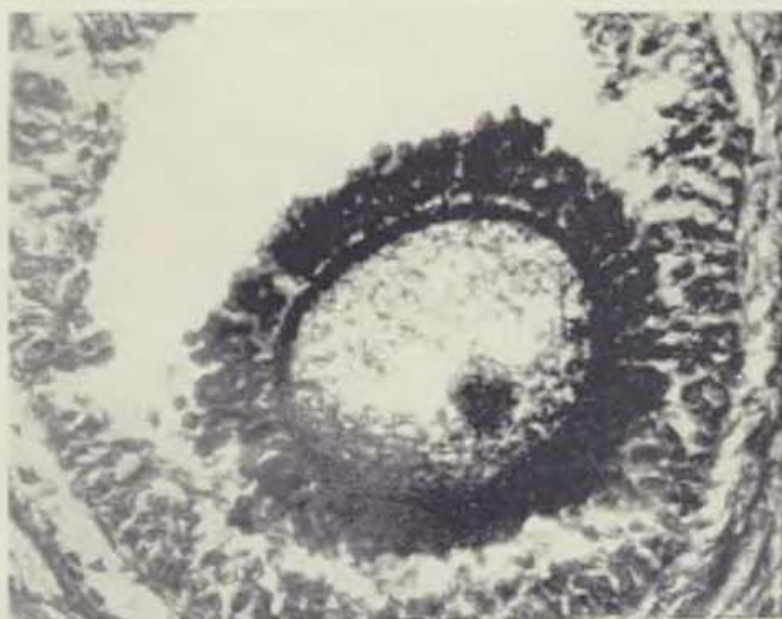


Fig. 4. Histological structure of mature follicle of dog 45 days after excision of the uterus and its appendages and their autotransplantation into omentum (stained by haematoxylin-eosin).

V. A. Chernavsky, Sh. Sh. Khamrayev

THE SURGICAL METHODS OF TREATMENT OF DUPUYTREN'S
CONTRACTURE



Fig. 1. Normal skin and palmar aponeurosis.



Fig. 2. Skin and palmar aponeurosis in Dupuytren's contracture.

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THE SURGICAL METHODS OF TREATMENT OF DUPUYTREN'S CONTRACTURE

V. A. CHERNAVSKY, SH. SH. KHAMRAYEV

The surgical treatment of Dupuytren's contracture originated already when it was first investigated. Prior to Dupuytren describing the anatomical features of this disorder, Cooper, in 1822, was the first to point out the role played by the aponeurosis in the development of this disease and suggested its surgical treatment. Both Cooper and Dupuytren carried out fasciotomy and achieved satisfactory results.

In 1887 Kocher, based on the above authors' observations, advised radical removal of the affected aponeurosis. He used longitudinal straight incisions which permitted wide exposure of the palmar aponeurosis.

In 1930, Ochlecker described an elliptic incision for the excision of the aponeurotic band together with the skin. This incision was modified by Beyool in 1938. Sometimes semi-circular extensions were added to the elliptic incision thus forming two flaps with their bases turned proximally.

Many authors (Lexer 1931, Keen 1960, Meleshko 1939 and others) suggested flap incisions; however, these incisions cannot be regarded of full value, because they permit exposure of the aponeurosis only in the palm and are, therefore, unsuitable for the excision of contracting bands in the fingers. T-shaped and cross incisions, too, did not satisfy the surgeons. A number of authors (McIndoe 1955, Iselin 1955, Matveyev 1926 and others) use a combination of incisions on the palm and in the fingers. These incisions are based on the principle of transposing local skin flaps. The resulting wound heals without tension.

In 1957, Chaklin recommended a bow-shaped incision. In 1958, Vorobyev used a Z-shaped incision and achieved very good results. In 1958, Bryantseva and in 1961, Shinkarenko assumed that for every case of Dupuytren's contracture the incision must be strictly individual, its shape depending on the number of affected fingers and the degree to which the palmar aponeurosis has been changed. Bryantseva, in particular, uses a bayonet-shaped incision (with rounded angles) or an incomplete S-shaped incision. Shinkarenko employs a flap incision with rounded edges. Vayn-Rib, in 1962, suggested a longitudinal incision starting at the distal flexion crease of the palm, following the crest of the sclerosed band of aponeurosis to its proximal end. He considers this incision

quite sufficient for any degree of Dupuytren's contracture making additional incisions on the fingers unnecessary. We, however, think this incision suitable only in the early stages of Dupuytren's contracture, prior to the process involving the fingers.

A number of authors [Ochlecker 1930, Bogoraz 1948, Dzhanlidze 1933, Bryantseva 1958 and others] recommend excision of the cicatrized palmar aponeurosis together with the skin and covering of the resulting skin defect with



Fig. 3. Course of skin incisions.



Fig. 4. Skin plasty in palm and finger with opposing triangular flaps.

free skin grafts or a Filatov flap. These authors assume that in Dupuytren's contracture, particularly when the fingers are badly deformed, the skin of the palm is affected by the pathological process and it is, therefore, useless to preserve it.

We do not agree with this point of view. Our histological investigations of specimens of skin plus cicatrized aponeurosis excised during operation on 20 patients with Dupuytren's contracture, proved that in spite of the close vicinity of the pathological process, which had affected the normal structure of tissue, the border line between the skin and these newly formed structures was always discernible. The bundles of collagenous fibres of the grossly thickened aponeurosis, running parallel to the skin surface, differ clearly from the loop-like and more loose arrangement of these fibres in the dermis proper (Fig. 1, 2). This morphological feature of Dupuytren's contracture permits separation of the skin at the border with the layers of different density without running the risk of damaging it and thus causing subsequent necrosis.

In 136 operations for Dupuytren's contracture, we never had to excise skin and resort to free skin grafting. We oppose skin excision, because the skin of the palm has its own blood supply. This was pointed out by Chen We-pey

in 1959. The excellent blood supply of the palmar skin can be deduced from the considerable bleeding on the surface of skin flaps, often mobilized over a wide area, after the release of the tourniquet.

Between 1955 and 1962, 120 patients with Dupuytren's contracture were treated at the Clinic of Traumatology and Orthopaedics of the Institute, 107 of whom were men, 13 women. In these 120 patients a total of 179 hands, 101 right and 78 left hands, were affected by the contracture. The right hand was affected more often than the left which corresponds to the data published by many other authors. In the 179 hands, a total of 301 fingers, 164 on right hands and 137 on left hands, were involved.

As to the different fingers contracture involved the little finger in 97 cases (33.3 %), the ring finger in 119 cases (37.3 %), the middle finger in 59 cases (19.6 %), the index finger in 16 cases (6.4 %) and the thumb in 10 cases (3.4 %). The ring and little fingers were involved most frequently, the middle finger less and the thumb and index finger least.

The patients could be divided into the following age groups: aged 21 to 30 — 7 patients; 31 to 40 — 14; 41 to 50 — 36; 51 to 60 — 45; 61 to 70 — 12; 71 to 80 — 5; 81 to 90 — 1. Thus the age group affected most is that between 41 and 60 years (76.2 %), which corresponds with the data given by Meleshko (1939). However, one must also agree with the statements of Beyool and a number of other authors, who maintain that mainly people at the age of 30 and more are affected by Dupuytren's contracture, because the patients do not seek the advice of the surgeons in the early stages of the disease, but only when the fingers become deformed and a handicap at work. According to our findings, 50 out of the 120 patients were admitted to the Clinic 10 to 32 years after the start of the disorder. Considering the age, at which the first subcutaneous thickening appeared in the palm, the largest percentage of patients was of an age between 30 and 40 years.

The method, which we have elaborated for the surgical treatment of Dupuytren's contracture, differs somewhat from the generally accepted one. Since 1955 we have treated 120 patients by this method. During this period a total of 136 operations were performed.

After proper preparation of the skin of the hand, we excise the cicatrized palmar aponeurosis. Of all the types of local anaesthesia we prefer infiltration with 0.5% novocaine. We inject the solution into the depth of the palm until it is completely infiltrated. Then a Bier tourniquet is applied to the lower third of the forearm. The hand is then placed on a splint which we have designed for this purpose and which permits fixation of the hand and the lower third of the forearm with bandages. The contracted fingers are stretched gradually with the stepwise removal of the contracting bands of the aponeurosis by means of a special screw mechanism attached to the end of the splint and fixed to the fingers with kapron threads led through the pulp of the terminal phalanges and fastened to the hooks of the stretch mechanism. By means of a roller the fingers are extended to the required angle and only then is the operation started. The achieved angle of extension is maintained by turning the roller.



Fig. 5. Patient Zh. prior to operation.



Fig. 6. Patient Zh. after operation.

We use none of the many suggested skin incisions in the palm, since even in a widely spread process, involving the middle finger, the ordinary half-oval incision, as a rule, fully suffices. This incision always starts at the base of the palm (where the palmar aponeurosis starts), runs in a half-oval curve skirting the contracting band sometimes on the radial, at other times on the ulnar side, depending on which finger or fingers are affected, and always stops 1 cm. short of palm-finger crease (Fig. 3).

Since 1955, we have used a longitudinal incision, but unlike Vayn-Rib, who starts it from the distal flexion crease of the palm, we begin 1.5 cm. proximal to the palm-finger crease, continue along the contracting band and finish at the root of the palmar aponeurosis, at the level of the radiocarpal joint. This incision is convenient for a wide exposure of the palmar aponeurosis and its excision, but only in the palm. The advantage of the longitudinal incision lies also in that it permits the formation of opposing triangular skin flaps to overcome skin contractures in the palm as well as the employment of additional incisions on the finger if this, too, is grossly contracted (Fig. 4).

The incision of the palm is made deep enough to expose the free space at once, i. e. through the skin and the adherent aponeurosis. After completion of the whole incision, the skin together with the aponeurosis is separated from the underlying tissue with a narrow and blunt spatula (resembling a Kocher sound) and vertical fibrous bands of the aponeurosis connecting it with the deeper situated structures are severed with a scalpel. After the skin edges have been somewhat mobilized a kapron suture is inserted into them which serves to dilate the wound; we avoid using metal hooks. Pulling at these kapron threads the skin together with the aponeurosis is gradually mobilized on both sides of the wound until it becomes fully mobile.

Then comes the most difficult and responsible part of the operation: separation of the cicatrized aponeurosis from the skin. If the aponeurosis is dissected with care and thoroughness, the skin need not be damaged at all. We consider

it far easier and safer to separate the aponeurosis from the skin, than, as has been reported, the skin from the aponeurosis. Our experience proves beyond any doubt that no matter how much the aponeurosis seems to be fused with the skin, the border line between the unaltered skin and this newly formed structure is always visible at operation.

In order not to damage the skin on the palm, we proceed as follows: the fibrous band of the aponeurosis are carefully severed transversely with a scalpel which, as a rule, leads to gradual straightening of the contracted finger. Sometimes the transverse incisions are supplemented by longitudinal ones severing the scar bands of the aponeurosis thus forming separated, unconnected sections. Then these sections are excised with scissors all the time well aware of the existing border line between the skin and aponeurosis. If the aponeurosis is excised in this way, the skin remains undamaged and, due to its own vascular network, its blood supply is not affected. Later, when the tourniquet has been released, little drops of blood appear at the wound edge of the separated skin bearing witness to the fact that the blood circulation in the skin has remained intact. After severing the scar bands connecting the aponeurosis with the skin, the vertical bands of the aponeurosis are excised whereby they must be followed deep between the vessels, nerves, tendons and muscles. Particularly marked fibrous bands of the aponeurosis are found at the proximal ends of the flexor tendon sheaths. The sheaths themselves are not affected, but they can be constricted by fibrous bands from the aponeurosis; the excision of the band frees the tendon from strangulation. Sometimes the excision of bands is implemented by a discission of the tendon sheath over a small section. After removal of all parts of the cicatrized aponeurosis in the palm, the wound is temporarily covered by a gauze pad soaked in hot physiological saline.

Then, if necessary, a rectangular incision is made on the basal phalanx of the affected finger and the cicatrized fascia is excised. If the band continues into the middle phalanx the horizontal arm of this incision is made in the distal third of the phalanx and the vertical arm runs down to the finger base on the volar-ulnar or volar-radial aspect of the finger in dependence on the distribution of the band. Both wounds, the one on the palm and the other in the finger, are joined by tunnelling the skin bridge between them. After excision of all fibrous bands the finger usually stretches to full extension. The tourniquet is then released, bleeding vessels ligated and the skin thoroughly sutured. Sometimes, skin has to be excised and the defect covered by a skin plasty; the only method we use is that of opposing triangular skin flaps both in the palm and the finger (see Fig. 6).

No hard fixation bandages are applied. The fingers are bandaged in flexion and a rubber sponge is fixed to the palm and removed on the 8th to 10th day.

Up to the removal of stitches no strenuous exercises, but only slight active flexion movements of the fingers are permitted. Two weeks after the wound has firmly healed, local baths and active as well as passive finger exercises can be started. If all of the cicatrized aponeurosis has been removed, the skin, which prior to the operation was shrunken, gradually returns to normal. Fitness for work is fully restored.



Fig. 7. Patient S. prior to operation.



Fig. 8. Patient S. after operation.

In severe, third-degree contractures, when the finger is completely flexed into the palm, it cannot be fully stretched on operation, because of the changes which have taken place in the joint. It is, therefore, not advisable to force full extension. In such a case one must be content with the maximum achieved mobilization of the affected finger or with assent of the patient, amputate it in some part of the basal phalanx. Neither by arthrotomy, nor by resection of the interphalangeal joint can, according to our experience, satisfactory results be achieved. On the contrary, complications usually arise which put the patient out of action for a long time.

In the 136 operations, we met with a total of 14 complications: in 6 patients the suture partly cut through, in one case even completely; in the remaining seven patients the wound edges sloughed off. All these complications healed completely and the function of the affected hand was fully restored in each case. In three patients we had to amputate the little finger because of the dislocation of the proximal interphalangeal joint. In another two patients the contracture of the proximal interphalangeal joint could not be corrected because of dislocation and other arthrogenic changes. The patients were advised to have the finger amputated, but refused. In 26 cases, because of skin shrinkage due to fibrotic contractures, we performed a skin plasty by way of transposition of opposing triangular flaps according to Limberg.

If the postoperative period is uneventful, the sutures are removed on the 14th or 15th day; in case of a postoperative haematoma on the 16th or 17th days. The average duration of in-patient treatment at the Clinic was 14.5 days.

In 50 patients we checked the late results after 5 and 1/2 years. 38 patients showed complete recovery and full restoration of function; six were operated on for a first-degree, 22 for a second-degree and 10 for a third-degree contracture. In nine patients with third-degree contractures, the deformity was not completely corrected, but the function of the fingers was fully restored. In two patients with a severe third-degree contracture, considerable deformity persisted and the function of the fingers remained impaired. In one patient with a second-degree



Fig. 9. Patient Ye. prior to operation.



Fig. 10. Patient Ye. after operation.

deformity, the contracture recurred after a year. In 3 patients with complete flexion contracture of the little finger we amputated the latter at the level of the basal phalanx.

In accordance with other authors, we are of the opinion that Dupuytren's contracture cannot recur, if the cicatrized palmar aponeurosis has been thoroughly removed in all its branches. If the contracture recurs it bears witness that not all fibrotic bands of the aponeurosis had been removed.

In the following, excerpts of the case papers of some patients are given:

Patient Zh., aged 60, Russian, engineer, was admitted to the Clinic of Traumatology and Orthopaedics on Jan. 12, 1962. He complained of rigid contracting bands in the palms of both hands and of flexion contractures of the ring finger in the right and the little finger in the left hand which handicapped him at work. The disorder was of 15-year's duration. Diagnosis: Second-degree Dupuytren's contracture of the ring finger in the right and the little finger in the left hand (Fig. 5). The operations was performed on the right hand on Jan. 16, 1962 and on the left hand on Jan. 30, 1962. In both hands a half-oval and on the finger a rectangular incision was used and the cicatrized aponeurosis was excised, after which the contracted fingers in both hands stretched to full extension. The healing of the wounds proceeded by first intention. The patient was checked up 13 months later: He had no complaints; the postoperative scars were soft, free of the underlying tissue, mobile, not tender to pressure, function and power of the hands were completely restored and sensitivity was unaffected (Fig. 6).

Patient S., aged 66, up to 1927 he was employed as a worker in a shoe factory, afterwards as a civil servant. On May, 21, 1962 he was admitted to the Clinic of Traumatology and Orthopaedics complaining of thickening and shrinkage under the skin of the palm in both hands and of a flexion contracture of the little finger on the right. The disorder was of ten years' duration. Diagnosis: Second-degree Dupuytren's contracture of the little finger of the right hand first-degree contracture of the index, middle and ring fingers of the right and of all fingers, including the thumb, of the left hand (Fig. 7). On May 23, 1962, the operation was carried out: On the right hand the cicatrized aponeurosis was excised through a Z-shaped incision in the palm*) and a rectangular incision of the

*) According to Vorobyev.

finger, after which the finger could be stretched to full extension. In the postoperative period complications arose due to the development of haematoma and marginal necrosis of the skin wound. The wound, therefore, healed by second intention. The left hand was not operated on. The patient was checked up 9 months later. He had no complaints, the scar on the right hand was soft, free of the underlying tissue, not tender, the function of the hand was fully restored and sensitivity unaffected (Fig. 8).

Patient Ye., aged 47, was admitted to the Clinic of Traumatology and Orthopaedics on Sept. 26, 1962, complaining of a rigid, considerable shrunken band in the palm of the left hand with contracture of the middle finger and of a rigid thickening under the skin of the palm in the right hand. The disorder was of 10 years' duration. Diagnosis: First-degree Dupuytren's contracture of the ring finger of the right and second-degree contracture of the middle finger of the left hand (Fig. 9). On Sept. 28, 1962, the operation was performed: The cicatrized palmar aponeurosis was excised on the left hand through a longitudinal incision extending from the distal third of the basal phalanx of the middle finger to the level of the radiocarpal joint, and two opposing triangular flaps were formed in the region of the finger-palm skin crease, according to Limberg. The finger could then be stretched to full extension. The wound healed by first intention. Check-up after five months revealed: The patient had no complaints, the postoperative scar was soft, free of the underlying tissue, mobile, not tender, the function of the hand and the strength of the fingers were restored to the full (Fig. 10).

CONCLUSION

1. Our method of incising the skin together with the aponeurosis and excising the aponeurosis and its contracting bands afterwards greatly simplifies the operation in Dupuytren's contracture.

2. Our histological investigations showed that there is always a clear border line between the skin and the pathologically changed aponeurosis. It is therefore always possible to separate the skin from the aponeurosis without running the risk of affecting the viability of the skin.

3. The contracting scar bands in the region of the finger-palm crease can be excised through a subcutaneous tunnel without making an incision through the crease itself.

4. Formation of opposing triangular flaps on the palm and fingers permits the correction of contractures of the fingers and suturing the skin without tension even in extensive skin contractures, and without resorting to free skin grafting.

SUMMARY

The article deals with the surgical method of treating Dupuytren's contracture elaborated at the Clinic of Traumatology and Orthopaedics of the Second Moscow Medical Institute. A total of 120 patients and 179 hands (101 right hands and 78 left hands) were operated on. Altogether 136 operations were performed.

The main features of the operation are a semi-oval incision in the skin of the palm and a right angular incision on the basal phalanx of the affected finger; the palm-finger fold is not severed.

The skin incision goes through the adherent palmar aponeurosis and the skin is then mobilized on both sides. Afterwards the aponeurosis is dissected from the skin and then excised together with all bands reaching into the depth of the palm. This procedure can be carried out because, as can be shown on histological obser-

ventions, there is always a clear borderline between the palmar skin and the adherent cicatrized aponeurosis.

The palmar skin, though apparently affected is not excised because it has its own blood supply. If necessary only a skin plasty by the method of opposing triangles is carried out. Late results were checked up in 50 patients.

R É S U M É

Les méthodes chirurgicales du traitement de la contracture de Dupuytren

V. A. Chernavskij, Sh. Sh. Chamrajev

L'article indique les méthodes chirurgicales du traitement de la contracture de Dupuytren, telles qu'elles ont été élaborées à la clinique de traumatologie et d'orthopédie du II^{me} Institut Médical à Moscou. Un ensemble de 120 malades et de 179 mains (101 mains droites et 78 mains gauches) ont été ainsi opérés. En tout, 136 opérations ont été exécutées.

Le principe essentiel de l'opération consiste dans une incision semi-ovale dans la peau de la paume et une incision rectangulaire dans la phalange basale du doigt atteint; la région palmaire du doigt n'est pas touchée.

Les incisions pratiquées dans la peau passent à travers l'aponévrose palmaire adhérente et, à la suite, la peau est mobilisée des deux côtés. Puis, l'aponévrose est détachée de la peau et excisée ensemble avec les rubans qui atteignent la profondeur de la paume. Il est possible d'exécuter cette intervention car, comme le démontre l'examen histologique, il existe toujours une ligne de démarcation nette entre la peau palmaire et l'aponévrose adhérente en voie de cicatrisation.

La peau palmaire, malgré qu'elle semble être affectée, n'est pas excisée car elle possède son propre réseau sanguin. Si cela est nécessaire, on n'applique qu'une plastie cutanée, à l'aide de la méthode des triangles opposés. Les résultats tardifs obtenus sur 50 malades sont analysés.

Z U S A M M E N F A S S U N G

Zur Methodik der operativen Behandlung der Dupuytren'schen Kontraktur

V. A. Chernavskij, Sh. Sh. Chamrajev

In der vorliegenden Arbeit wird die Method der operativen Behandlung der Dupuytren'schen Kontraktur beschrieben, die an der Klinik für Traumatologie und Orthopädie des II. Moskauer Medizinischen Instituts ausgearbeitet worden ist. Es wurden 120 Patienten operiert, die 179 Kontrakturen aufwiesen (101mal an der rechten, 78mal an der linken Hand). Insgesamt wurden 136 Operationen vorgenommen.

Die Operation beruht in einem bogenförmigen Hautschnitt im Bereich des Handtellers und einem hakenförmigen Schnitt im Bereich der Grundphalange des betroffenen Daumens. Die Daumen-Handteller-Falte wird nicht zerschnitten.

Die Haut wird zugleich mit der mit ihr innig zusammenhängenden Palmaraponeurose durchschnitten und nach beiden Seiten hin mobilisiert. Dann wird die Aponeurose von der Haut abgetrennt, worauf zusätzlich alle Aponeurosenzüge in der Tiefe des Handtellers durchschnitten werden. Dass diese Methodik durchführbar ist, ergaben histologische Untersuchungen, die nachwiesen, dass zwischen der Palmarhaut und der mit ihr verbundenen narbig veränderten Aponeurose immer eine Grenze besteht.

Die sichtlich veränderte Palmarhaut wird nicht entfernt, da diese über eine eigene Blutversorgung verfügt. Wo die Notwendigkeit besteht, wird lediglich eine Hautplastik mittels dreieckiger Hautlappen vorgenommen.

Die Spätresultate wurden an 50 Patienten überprüft.

RESUMEN

Los métodos quirúrgicos del tratamiento de la contractura de Dupuytren

V. A. Chernavskij, Sh. Sh. Chamrajev

El trabajo se ocupa del método quirúrgico del tratamiento de la contractura de Dupuytren elaborado en la Clínica de Traumatología y Ortopedia del Segundo Instituto Médico de Moscú. Fueron operados 120 pacientes y 179 manos (101 manos derechos y 78 manos izquierdos) en total. En conjunto fueron ejecutadas 136 operaciones.

Los rasgos principales de la operación constituyen una incisión semi-oval de la piel de las palmas y una incisión angular recto en la falange basal del dedo afectado; el pliegue del dedo de palma no está separado.

La incisión de piel pasa a través de la aponeurosis palmar adherente y luego la piel está movilizada bilateralmente. Después la aponeurosis está disecada desde la piel y luego extirpada junto a todas las cintas que penetran en la profundidad de la palma. Este procedimiento puede ser ejecutado porque — lo que es posible mostrar en observaciones histológicas — hay siempre una línea limítrofe clara entre la piel palmar y la aponeurosis cicatrizada adherente.

La piel palmar, aunque está afectada evidentemente, no está extirpada porque tiene su propio abastecimiento de sangre. En caso de necesidad se ejecuta sólo una plastia de piel por el método de triángulos oponentes. Se investigaron resultados tardíos en 50 pacientes.

REFERENCES

1. Beyool, A. P.: Collected Papers of the Surgical Clinic of the First Moscow Medical Institute; p. 82, 1938.
2. Bogoraz, N. A.: Reconstructive Surgery. V 2, No 2, p. 343; Moscow 1948.
3. Bryantseva, L. N.: Dupuytren's Contracture. Cand. dissertation. Leningrad 1958.
4. Vayn-Rib, M. A.: Ortop. Travm. Protez. 11, 66, 1962.
5. Vorobyev, V. N.: Dupuytren's Contracture and Its Surgical Treatment. Cand. dissertation. Leningrad 1958.
6. Dzhanlidze, Y. Y.: Vestn. Chir. im. Grekova 90—91, 199, 1933.
7. Limberg, A. A.: Mathematical Principles of Local Plasty on the Surface of the Human Body. Leningrad 1946.
8. Meleshko, E. R.: Khirurgia (Mosc.) 12, 78, 1939.
9. Chaklin, V. D.: Ortopedia (Mosc.) 2, 577, 1957.
10. Chernavsky, V. A., Pavlova, Z. N.: Ortop. Travm. Protez. 4, 57, 1962.
11. Shinkarenko, I. N.: Dupuytren's Contracture of Fingers and Its Treatment with Hyaluronidase Preparations. Cand. dissertation, Moscow 1961.
12. Cooper, A.: A Treatise on Dislocations and on Fractures of the Joint. London 1823, p. 524.
13. Iselin, M.: Chirurgie de la main. Paris 1955.
14. Keen, W. W.: Amer. J. Med. Sci. 131, 23, 1906.
15. Kocher, T.: Zbl. Chir. 14, 26—27, 297—502, 1887.
16. Lexer, E.: Die gesammte Wiederherstellungschirurgie. V 2, p. 837, Leipzig 1931.
17. McIndoe: quoted by Mason, M. I.: Surg. Clin. N. Amer. 32, 233, 1952.
18. Ochlecker, F.: Beitr. klin. Chir. 149, 333, 1930.
19. Ochlecker, M.: Zbl. Chir. 57, 1102, 1930.

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GENERAL PRINCIPLES OF TREATMENT OF THERMIC BURNS IN CHILDREN AND THE PROBLEM OF AUTO- AND HOMOTRANSPLANTATION OF SKIN

M. V. VOLKOV, R. L. GINSBURG

The anatomico-physiological peculiarities of the infantile organism are the cause of burns sickness taking a more serious course in children than in adults, particularly in infants and children of nursery age.

Burns constitute a great percentage in the accident rate of children. The Institute of National Statistics of France (Aubenque) disclosed that, on an average, 1,000 people die from burns in France each year [according to Thalheimer*]], 20 % of whom are children up to the age of five. This is an enormous number. Daumier (1937) calculated the death rate at 14.6 %, Ternovsky (1939—1949) at 3.04 %, but already in the years 1948—1951 it came down to 2.3 % for patients treated in hospital, which may be attributed to the improved methods of treatment.

Burns, even of 8—10 % body surface, can be lethal in children, because shock, toxæmia, loss of plasma, etc. are tolerated worse by younger children. The high death rate of burns in children can also be explained by the delicate texture of their integument permitting the noxa to reach the underlying tissue as well as by the inadequate immunological qualities of the infantile organism. The younger the child, the more severe the course of burns sickness (Ternovsky). Large burns, even of second degree, can be fatal in small children.

The death rate of burns in children is still very high and requires further study of the cause of death and investigation of new methods of treatment.

The most frequent accidents causing thermic burns in children of an early age are the following:

1. Scalding with hot fluid constitutes 90 % of all burns. Overturning pots with boiling water, hot milk or soup, falling into a washing tub filled with hot water, etc. cause burns in children involving the entire thickness of the skin. A glass of tea toppled over from the table may actually cause large burns on the body surface of a child.

*) Thalheimer, Academie de Chirurgie, V 84, No 26, p. 27, 1958.

2. Contact burns from touching a hot-plate, flat-iron, metal, etc. i.e. all burns due to the absence of vital habits in children and to adults not taking adequate care of them.

3. Burns caused by flames always in connection with the clothes catching fire in a conflagration, in an explosion of a cooker for kerosine or other inflammables, while playing with petrol and matches, etc. Such burns are usually sustained by children of school age (9 to 13). It ought to be noted that the underwear and coats of children and women nowadays are made of synthetic material (nylon etc.) which is highly inflammable and burnt up instantly. These accidents usually cause burns largest in size, involving the entire thickness of the skin, and, therefore, always severe in children. Their treatment requires considerable time and the application of complex modern therapeutic measures.

4. Electrical burns always involve the entire thickness of the skin and sometimes even the underlying tissue. They, too, occur in accidents due to the children not being properly supervised. Their treatment takes a particularly long time.

In the resolution of the 27th All-Union Congress of Surgeons, Soviet surgeons have adopted a unified classification of thermic burns: degree 1 = erythema of skin, degree 2 = development of blisters, degree 3a = incomplete necrosis of skin permitting epithelization in islets, degree 3b = complete necrosis of skin involving the entire thickness, degree 4 = necrosis of skin and underlying tissue.

The severity of burns sickness in children not only depends on the depth but also on the area and the site of the damage. Thus burns of 8—10% of body surface cause shock in a child, but if the face and the hairy part of the skull are affected, even 4% may be lethal [Laurence*]].

In order to determine the size of burns, the percentage of body surface (according to Postnikov) is used in the Soviet Union. However, to us, it seems that for practical purposes the method of the ninths and that of Berkow may be employed since it is widely used both in the Soviet Union and abroad. Neither of the two methods is very exact, but this is of no practical importance. When using the method of the ninths corrections are made according to the age of the children (Ternovsky): Up to the age of one, the head represents 18%. For the remaining localizations each ninth must be lowered by one unit; for instance: in a six-month-old baby the lower extremities are calculated at 16% each, i.e. 32% both, both upper extremities at 16%, the trunk (anterior and posterior surface) at 32%.

At the age of five the head represents between 12% and 14%. For the other parts each ninth is reduced by 0.5%, i.e. to 8.5%, e.g. both lower extremities amount to $(17 \times 2) = 34\%$, the trunk $(17 \times 2) = 34\%$, both upper extremities = 17%.

A method similar to that of the ninths is the method of Berkow, used in the

*] Laurence, Academie de Chirurgie 29, 10, 1958.

USA, by which the percentage of body surface damaged is calculated in fifths and tenths.

In the treatment of burns shock and acute toxaemia, combating pain is of first-rate importance. For this purpose narcotics (such as morphia, Pantopon, Omnopon, etc.) and analgetics (such as Promedol, Lidol, etc.) are used. In children up to the age of one Promedol is used as a rule; up to the age of 6 months the dose is 0.2—0.5 ml. of a 1% solution; over 6 months 0.5—1.0 ml. depending on the area burned and the general condition of the patient. At this age drugs of the phenothiazine order, particularly Diprazin (synonymous with Pipalphen, Suprastin, Phenergan) are also effective. Diprazin is given in a dose of 2—4 mg/kg. body weight, but the single dose must not exceed 20—25 mg. (Menyalov).

Good results, too, have been achieved with a fast intravenous injection of 3—6 ml. of a 1/4% solution of novocaine. At present analgesia with nitrous oxide is used as a routine measure at CITO*) for the surgical toilet of burns and painful wound dressings, which thus are well tolerated by the children. Great importance in the treatment of the acute stage is ascribed to the use of moistened oxygen. Small children are placed into special incubators, and in older children oxygen is given through a catheter introduced through the inferior nasal meatus down to the entrance into the larynx. The length of the catheter to be introduced may be estimated by the distance between the tip of the nose and the ear lobe.

Simultaneously with the above mentioned measures taken for combating shock and acute toxaemia, we also give transfusion. In children with burns affecting 8% of body surface (but already with 3—4% of the face or the hairy part of the skull burned), transfusion is imperative. In burns of 15—20% the amount of infused fluid should equal half the volume of plasma in the blood, and it should be given as a drip during the first four hours after admission. The amount of fluid infused is doubled in burns of 30—40%.

The total amount of fluid to be infused is calculated by the formula of Gross:

In small children the formula of Thalheimer may be used who, at an early age, recommends transfusion of an amount of fluid equalling

10% of body weight up to the age of one,

7.5% of body weight from 1 to 2 years,

5% of body weight over 2 years.

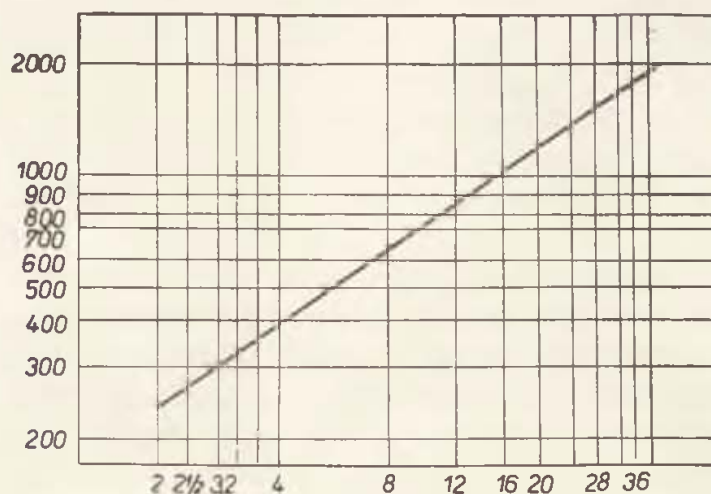
The composition of the fluid used in children for intravenous infusion is very important, because in burns mainly plasma and fluids are lost, whereas electrolytes are retained. The solution must contain plasma, polyglycine, glucose 2.5 to 5.0% and no more than 20% of saline of the total amount infused.

In burns sickness great importance is assigned to immunotherapy, i. e. transfusion of convalescent blood and the administration of gamma globulin.

In the event of dynamic ileus, which sometimes occurs in severe burns, a hypertonic enema, paranephritic novocain blockade gastric lavage are indicated.

*) Central Institute of Traumatology and Orthopaedics.

In case of great restlessness 30—50 ml. of a 1% chloralhydrate solution is injected into the rectum with a syringe attached to a catheter, but analgetics and sedatives given intravenously, are also used. In cardiovascular disorders Cardiamine, camphor, Novocainamide and a generally roborating therapy (suitable food, vitamin C in large doses and other vitamins) are indicated.



Tab. 1. 24-hour dosage of parenteral fluid administration to children in relation to body weight (according to Gross); x — solution in ml./24 hours, y — weight of child in mg.

Frequently, usually on the fourth day, a rash may appear on the skin of the child. Some authors (Bykova and Alexeyeva) assume it to be the manifestation of wound scarlatina, others (Ternovsky) however, take it for toxic exanthema.

These rashes have ceased to appear ever since we started to give blood transfusions to every child on admission without exception, i. e. regardless of the area burned.

The local treatment of burns starts with the application of first aid. The further development of the pathological and restitutional process depends on the quality of first aid rendered. On early admission the wound is not yet infected. Only when the patient is admitted to hospital late it may already be infected or may become so afterwards.

The organization of a well equipped dressing theatre must guarantee aseptic performance of surgical toilet and wound dressing.

The local treatment, i. e. surgical toilet of the wound, consists of the least traumatizing handling of the wound, careful removal of all necrotic and necrotizing tissues, cleansing of the skin around the wound with benzine, alcohol or 1/4% liquid ammonia and rinsing of the wound with saline to which penicillin and novocaine are added. The local treatment of fresh burns in children is carried out by the open or the closed method, depending on the age of the patient and the localization of the lesion.

At children's surgical hospitals the open method of treatment using coagulating substances is employed, according to Nikolsky-Betman. Great merit in propagating this method goes to Ternovsky (freshly made 5% tannin and 10% silver nitrate solution). A black scab develops which well protects the wound

surface from loss of plasma, infection and pain. The tough crust also serves as fixation of the damaged extremity.

In children this method gives good results which contradict the statement of American authors about the toxic effect of tannin in the treatment of burns. Proteins coagulated with tannin-silver nitrate are insoluble and do not absorb toxic substances.

In small children it is very difficult to keep the dressing clean. Wound dressings are painful and badly tolerated by small children, the delicate infantile skin surrounding the wound easily becomes macerated. That is why the coagulation method has found wide usage, particularly in the treatment of infants and children of nursery age.

The open method of treatment without using coagulating substances is also employed in children both in the Soviet Union and abroad.

To carry out the treatment by this open method, special conditions are required: accommodation in one ward of two patients at the most, trained personnel well acquainted with the rules of asepsis and the care of such children.

The closed method of treatment has proved its value in older children, i. e. in children of school age and in those requiring surgical treatment. Superficial burns (of II and IIIa degree) healed well by either method of local treatment provided infection was absent.

Deep burns with damage to the whole thickness of the skin were indications for surgical treatment in children of all ages. The necrotic tissues must be removed and the defect covered as early as possible (between the 6th and 12th day) by subsequent plasty. We proceeded in this way in children who were admitted early after the accident and in satisfactory general condition.

The skin defect was covered with auto- or homogenous skin immediately after the removal of the slough, in most cases 6 to 8 days after the accident.

The take of the graft did not proceed any worse than in adults. Children tolerate even drawn-out operations, but success depends on the preoperative treatment and the way the anaesthetic and the operation itself are performed.

In large burns surgical treatment meets with more complicated conditions, but even in these cases the difficulties can be overcome by early excision of the necrotic parts. Because children tolerate loss of blood badly the excision must be executed in stages and the resulting wound surface covered immediately. In large burns, but even in burns of 8 to 10%, it is impossible to cover the defect with autogenous skin, because the lifting of grafts from a corresponding large donor area (10% body surface) results in doubling the total wound surface (i. e. in the given instance to 20%).

The immediate coverage with autogenous skin of large wound surfaces resulting from the removal of the necrotic parts is often impracticable, not only because there is not enough healthy skin left in burns involving a large area of the body surface, but also because of the danger to the child brought about by the additional trauma. The resulting wound surface in the donor area represents an additional source of irritation and in certain cases requires supplementary treatment which, in seriously ill patients, may not always be effective.

Autotransplantation in children ought to be undertaken with certainty of success and, therefore, the cases indicated for it must be carefully selected. In large burns, when the wound is to be covered immediately, we use homogenous skin conserved at low temperatures. It protects the wound from contamination, checks loss of plasma, stops bleeding, rids the patient of pain and facilitates regeneration of tissues both from the wound edges and the surviving epithelial elements of the skin glands. All this helps to bring the child through the critical period of burns sickness.

In some cases we used a combination of auto- and homotransplantation according to the method of Mowlem-Jackson: Strips of auto- and homogenous skin are grafted alternately whereby the width of each homotransplant should not exceed 1 cm., that of the autotransplant 0.5 cm. This method can be employed, if the general condition of the patient permits lifting a limited amount of autogenous skin grafts. The method has proved its value in children, in small children, however, it is not always practicable, because of the limited area of healthy skin available and the bad healing of the donor sites.

We have made a study of 26 children between the ages of 2 and $\frac{1}{2}$ to 15 years in whom we had performed homotransplantation of skin:

The grafts of homogenous skin were prepared, in all cases, at the laboratories for tissue conservation of CITO by freezing at -70°C for 24 hours, followed by storage at -20°C . The skin specimens were taken from cadavers of adults and 5-6 month-old human embryos. Foetal skin does not show any deterioration in the first weeks after take and, according to Soviet scientists (Okulova), it survives for a longer period. This is the subject of further investigation.

The youngest children in whom we employed homotransplantation were one, $2\frac{1}{2}$ years old, with burns of second and third degree over an area of 55% of body surface (the patient died 13 days after the accident), and another, aged $4\frac{1}{2}$, who was treated at the burns unit of CITO. The latter's case history is given below:

F. Alexander, aged 4 and $\frac{1}{2}$, case paper No 2169, was admitted to CITO on 28th Oct., 1961, and discharged on 17th April, 1962. On 24th March, 1961, when jumping over a bonfire, he fell into the flames and sustained 3rd degree burns of both legs, both buttocks and the genitals, totalling 22% of body surface. Between 24th March and 28th Oct., 1961, he was treated at a district hospital by the application of paraffin dressings to the extremities. During the three months after the removal of the necrotic tissues, homotransplantation of skin was performed twice, using the patient's brother as donor. Within ten days the granulating surface was almost completely epithelized, but on 20th Sept., i.e. approximately one month later, the process of dissolution started [cit. case history of district hospital]. Afterwards the wound surfaces on both buttocks and the left thigh were left to heal spontaneously. Seven months after the accident the patient was transferred to CITO. On admission we found ulcerating scars in the region of both buttocks, the perineum and the left thigh, granulating wounds on the entire circumference of the right thigh and leg. Ten days after admission and following preliminary preparation of the patient, the operation was performed on 10th Nov. The granulating surfaces were covered with auto- and homogenous skin grafts (according to the method of Mowlem-Jackson). The wounds then healed over a large area. Six

weeks later, on 27th Dec., a second free skin autoplasty was performed. The transplants took completely, but in the following period some of the grafts underwent absorption. In the subsequent period further auto-homotransplantations of skin were carried out combined with the administration of B₁₂ vitamin, 5% ascorbic acid, etc. which brought about complete cure after 5 and 1½ months of treatment.

The thickness of the skin transplant, both auto- and homogenous, depends on the patient's age; for two-year-old child the grafts must be thinner than, for instance, for a ten-year or twelve-year-old child, the average thickness being 0.3—0.4 mm., sometimes, however, even 0.2 mm. In patients who were admitted to CITO late and in a state of burns cachexia, we employed homotransplantation and succeeded in improving their condition to such an extent that we could then resort to transplantation of autogenous skin which brought about a complete cure.

B. Agessa, a girl of nine, case paper No 728, at CITO from 21st Feb. until 28th Aug., 1961, was suffering from burns which she had sustained when her clothes caught fire while standing too near the stove. Burns of 2nd and 3rd degree covered the thorax, neck, face and both upper extremities, totalling 33% of body surface. Severe shock was present. The usual antishock therapy was carried out and afterwards the method of open treatment employed, according to Nikolsky-Betman.

During the following four days plasma, 5% glucose and saline were given intravenously and a solution of bicarbonate was administered by drip per rectum.

Two months after the accident, on 21st April, four large wounds, 26 by 32 cm., 24 by 17 cm., 21 by 15 cm. and 10 by 5 cm., situated on the thorax and both upper extremities, were covered with transplants of homogenous skin taken 21 days earlier from the amputated leg of a boy, aged 11, and conserved at a temperature of +4°C. At the same time two grafts of autogenous skin were lifted with a dermatome from the right thigh and also transplanted onto the wound surface.

Two months later, on 22nd June, complete absorption of the homotransplants was registered, but almost the entire wound surface showed intensive epithelization. The patient was discharged on 28th August.

The interesting feature of this case is that the transplants of homogenous skin were taken from an eleven-year-old boy which may, perhaps, account for the longer survival of these grafts and, chiefly, for their stimulating effect promoting exuberant epithelization.

F. Tatyana, a girl aged four, case paper No 1418, whose clothes had caught fire from an electrical hot-plate, sustained burns on the thorax and the left upper extremity over an area of 18% of body surface. She was first treated in a district hospital and on 31st July, 1957, seven months after the accident, she was admitted to CITO; she was subsequently treated by several transplantations of homogenous skin and later by the method of Mowlem-Jackson of transplantation of alternating strips of homo- and autogenous skin grafts. The treatment was completed within 11 months.

According to the data of many paediatric surgeons, there is a considerable death rate in children up to the age of three, particularly in the first hours and days after the thermic injury.

In infants and small children homotransplantation with conserved skin and fresh skin taken from the parents is particularly indicated in case of emergency.

We do not favour taking skin grafts from live donors, but if there is no conserved skin available, the surgeon is entitled to use skin from the child's mother or father.

The low immunological reactivity of a small child guarantees a longer survival of homotransplants and that is why homotransplantation is especially indicated at an early age, because the longer survival of the grafts permits us to bring the patient through the critical condition at this very dangerous age.

Thalheimer (1958) reports on a case of burns of 16% of body surface in an infant treated by transplantation of skin grafts taken from the mother. With these he covered the anterior aspect of the neck and trunk which prevented the development of shock, stopped pain and checked plasma loss. Within three weeks the homotransplants took completely. On the 21st day, he points out, the grafts showed rapidly progressing absorption, and underneath them exuberant epithelization took place, evidently originating from the epithelium of skin glands which had been spared from damage at the time of accident.

Other papers about successful homotransplantation of skin in children, even in infants, have also been published in the literature [Fourrier 1952*]].

Homotransplantation of skin, even if only as a biological dressing, is no doubt indicated in large burns, particularly in infants and small children.

In a number of instances the children were admitted to CITO not with fresh burns, but two, four and even eight months after the accident with large, infected and suppurating wounds in a condition of burns cachexia. In these cases homotransplantation was particularly indicated, since it became the only salvation of these apparently "hopeless" patients.

The following case history demonstrates our contention:

S. Anatoly, a boy aged 11: On 16th Oct., 1957, he fell through an open hatch into the well of a boiler-room. The wire netting covering the well gave way under the weight of the falling body and thus both his legs got immersed in boiling water. The patient was admitted to the Bauman Hospital with shock and circular burns of 3rd and 4th degree on both lower extremities.

On the third day the patient developed tetanus. After the complex treatment of shock and tetanus, and after treating the wounds with tulle gras dressings, the patient was transferred to CITO on 20th Dec., 1957, i. e. two months after the accident. On admission the boy was in a grave condition, restless and crying. The dressing emitted a strong smell and after its removal, circular 3rd degree burns on both lower extremities were uncovered. The left knee was contracted to an angle of 120° , the left foot showed marked talipes equinovarus deformation. The right foot was hanging limply in a position of plantar flexion and supination, and the right knee was also contracted. In addition there was a fracture of the lateral malleolus, and the ankle joint was dislocated forwards and medially. Under nitrous oxide anaesthesia the contractures were mobilised and the dislocation reduced, and then plaster casts were applied to both extremities with the joints in functional positions. The wounds continued to discharge copious pus of an ichorous (acrid) smell. Shortly after the patient's admission, because his general condition did not improve, a consultation was held as to whether amputation of both lower extremities was not indicated in order to save his life. It was decided, however, to postpone this operation and see whether covering of the wound surface with homogenous skin would not bring about a turn for the better. This was performed in three stages,

*] P. Fourrier, Lyon Chirurgical 47, 2, 231—232, 1952.

every time followed by a complex of therapeutic measures (transfusions of blood plasma for 1—2 days, the administration of vitamins and antibiotics in accordance with the bacterial flora in the wounds, and a high protein plus vitamin diet). The wounds gradually cleared.

After the homotransplantations the wounds grew markedly smaller in area which made it possible on 27th Jan., i. e. two months after admission, to perform an autoplasty with skin grafts lifted from the back and partly also from the thigh. A second operation, also an autoplasty, was carried out one month later, on 20th Feb. With the gradual improvement of the patient's general condition the healing process, too, progressed more favourably.

On 19th Sept., 1958, 9 months after admission to CITO, the boy was discharged in good general condition with the wounds healed, walking on his own legs, only with some deformation of the left foot. He was prescribed a pair of orthopaedic boots.

The worse the general condition of the patient, the longer the homotransplants survive. After elimination or "dissolution" of the grafts the underlying wound surface was usually covered with beautiful, pink granulations. We then usually grafted homotransplants for a second time without removal of the granulations. We found that these grafts survived for a shorter period than after the first transplantation. The wound, however, grew smaller on account of marginal epithelization. In this way we improved the condition of the patient to such an extent that autotransplantation of skin could be performed. Even then we did not shave off granulations, because we had not seen any better take of the grafts after the removal of granulations. On the contrary, leaving them intact prevented bleeding which, even if only little blood was lost, was not without danger to a small child.

After each homo- or autotransplantation we applied hydrocortisone locally together with dry penicillin. Every day, without removing the bottom layer of the dressing, we continued to apply hydrocortisone with penicillin over a period of six to seven days, until a dry crust had formed over the wound which prevented both infection and oedema; the healing proceeded as under a dry scab.

When the patients had been brought through the critical condition, good results were achieved in children with the method of grafting autogenous microtransplants of the dermoepithelial layer and the dermis (according to Morel-Fatio and Nicoletis), whereby, in a child the strips of skin can be excised and the wound in the donor area sutured without leaving an additional open wound surface.

The microtransplants took perfectly and the donor sites healed by first intention in all instances.

In conclusion we may say that in children only the complex treatment of burns sickness gives satisfactory results in large and deep burns. However, one of the main measures — as important as transfusion therapy — is excision of the necrotic tissue followed immediately by a full coverage of the wound with auto- or homogenous skin. This has made it possible to lower the death rate even of patients with severe burns.

SUMMARY

The authors draw attention to the peculiarities of the course of burns sickness in children. An analysis is given of the most frequent causes of thermic burns in children, the different degrees of burns are classified with regard to the depth of the damage and the course of burns sickness is dealt with in relation to the extent of the area burned, the site of the damage and the age of the child. Examining the problems connected with combating shock, toxæmia and exciccosis, they deal in more detail with the treatment of deep, third-degree burns.

Endorsing the method of surgical treatment, i. e. excising the wound at an early stage and covering the defect with homogenous or a combination of homo- and autogenous skin, the authors give data on 26 patients, aged between 2 ½ and 15 years, suffering from extensive and deep burns, treated by this method. It helps to avoid toxæmia, to cope with shock and to attain conditions which are more suitable for the employment of autotransplantation, i. e. a stage of burns sickness which is less dangerous to the patient and thus more favourable to a successful take of the grafts.

RÉSUMÉ

Principes généraux du traitement des brûlures des enfants et le problème des auto- et des homogreffes dermiques

M. V. Volkov, R. L. Ginsburg

Les auteurs attirent l'attention sur les particularités du développement de la maladie des brûlures chez les enfants. On analyse les causes les plus fréquentes des brûlures thermiques des enfants, les degrés différents des brûlures sont classés en tenant compte de la gravité de la lésion et le développement de la maladie des brûlures est mis en rapport avec la surface brûlée, la localisation de la lésion et l'âge de l'enfant. En examinant les problèmes qui se posent en rapport avec la thérapie du choc, de la toxémie et de la désiccation, on expose plus en détail le traitement des brûlures profondes du troisième degré.

En décrivant la méthode du traitement chirurgical, c'est-à-dire l'excision de la plaie à un stade précoce et la couverture de la lésion par de la peau homogène ou une combinaison de la peau homo- et autogène, les auteurs présentent les dates de 26 malades, âgés de deux ans et demi jusqu'à 15 ans, atteints de brûlures étendues et profondes et traités à l'aide de la méthode indiquée. Celle-ci est utile pour éviter une toxémie, pour combattre le choc et pour créer des conditions plus favorables pour pouvoir appliquer l'autogreffe, c'est-à-dire un état de sécheresse des brûlures moins dangereux pour le malade et ainsi plus favorable pour le prélèvement des greffons.

ZUSAMMENFASSUNG

Allgemeine Grundsätze der Behandlung von Verbrennungen bei Kindern und Probleme der Auto- und Homohauttransplantation

M. W. Wolkow, R. L. Ginsburg

Die vorliegende Arbeit richtet ihr Augenmerk auf Besonderheiten im Verlauf der Verbrennungskrankheit bei Kindern. Sie bringt eine Analyse der häufigsten Ursachen von Verbrennungen des Rumpfes bei Kindern und erörtert die Klassifizierung der ein-

zelenen Verbrennungsgrade in Abhängigkeit von der Tiefe der Schädigung, weiters Probleme des Krankheitsverlaufs bei Verbrennungen im Zusammenhang mit der Ausdehnung und Lokalisierung der Verbrennungen sowie dem Alter des betroffenen Kindes. Bei der Besprechung des Kampfes gegen Verbrennungsschock, Toxämie und Exsikkose befassen sich die Verfasser eingehend mit der Behandlung tiefer Verbrennungen dritten Grades.

Die Verfasser befürworten die frühzeitige chirurgische Exzision der Verbrennungswunde und empfehlen die Deckung des Defekts durch Homohaut oder Kombination von Homo- und Autohaut; sie berichten über 26 Kinder im Alter von 2 ½ bis 15 Jahren, die wegen ausgedehnter und tiefgehender Verbrennungen nach dieser Methode behandelt wurden, und betonen, dass diese Behandlungsweise es gestattet, einer Toxikose vorzubeugen, den Verbrennungsschock zu meistern und Bedingungen herbeizuführen, die die erfolgreiche Durchführung autoplastischer Hautübertragungen zu einem Zeitpunkt ermöglichen, da sich der Patient bereits in einem weniger gefährlichen Stadium der Verbrennungskrankheit befindet.

RESUMEN

Principios generales del tratamiento de las quemaduras en niños y el problema de la auto- y homotransplantación de la piel

M. V. Volkov, R. L. Ginsburg

Los autores llaman atención sobre las particularidades del transcurso de las quemaduras en niños. Presentan un análisis de las causas más frecuentes de las quemaduras; los diferentes grados se clasifican según la profundidad del perjuicio y el curso de la enfermedad causada por quemaduras se discute en relación a la región quemada, la localización del perjuicio y la edad del niño. Examinado los problemas asociados con el choque combatiente, toxemia y exciccosis los autores tratan en más detalle del tratamiento de las quemaduras hondas del tercer grado.

Aprobando el método del tratamiento quirúrgico, es decir la excisión de la herida durante un estado inicial y la cubierta del defecto por la piel homogénea o por una combinación de la piel homo- y autógena, los autores presentan datos de 26 enfermos, en la edad entre 2 ½ y 15 años, con quemaduras extensivas y profundas, que fueron tratados por este método. El método ayuda evitar toxemia, arrostrar el choque y lograr condiciones que son más adecuadas para el empleo de la autotransplantación, es decir, un estado de la enfermedad causada por quemaduras que está menos peligrosa al paciente y por eso más favorable para una toma exitosa de los injertos.

REFERENCES

1. Ternovski, S. D., Shishakova, S. V.: Burns in Childhood. XXVII All-Union Surgical Congress, USSR.
2. Ternovski, S. D.: Paediatric Surgery. Burns. Medgiz, Moscow 1953, p. 76—84.
3. Daumier, N. H.: Child Traumatology. Medgiz, Moscow 1960, p. 72—83.
4. Okulova, A. N.: Homoplasties by Preserved Tissue from Human Foetuses. Second All-Union Conference on Tissue Incom-
5. Prendiville, J. B.: J. Irish Med. Ass. 41, 245, 148—154, 1957.
6. Fourrier: Lyon chir. 47, 2, 231—238, 1952.
7. Thalheimer: Académie de Chirurgie, 29 Octobre 1958.
8. Kyle, M. J., Wallace, A. B.: Brit. J. Plast. Surg. 3, 194, 1950.

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CAMPYLODACTYLIA (a preliminary communication)

L. BAŘINKA

In this preliminary communication the author would like to draw the attention of local and school doctors to the little known, and from the aetiopathogenetic aspect little investigated, disease known as campylodactylia.

For practical purposes attention must be drawn to frequent errors in the differential diagnosis and to the present state of treatment of this disease, together with the possibility of prevention associated with active search. Patients are most frequently sent to the author's clinic with a diagnosis of Dupuytren's contracture, while in younger patients the condition is wrongly diagnosed as juvenile Dupuytren's contracture, congenital, idiopathic contracture, congenital contracture of the tendons, etc.

The patients are wrongly informed on surgical or X-ray treatment, although both are contraindicated in this disease. When evaluating the patient's fitness for work, the condition is also often minimized and the advice of specialists who suggest prophylactic measures for preventing further deterioration is frequently neglected. The present paper therefore concentrates on these questions.

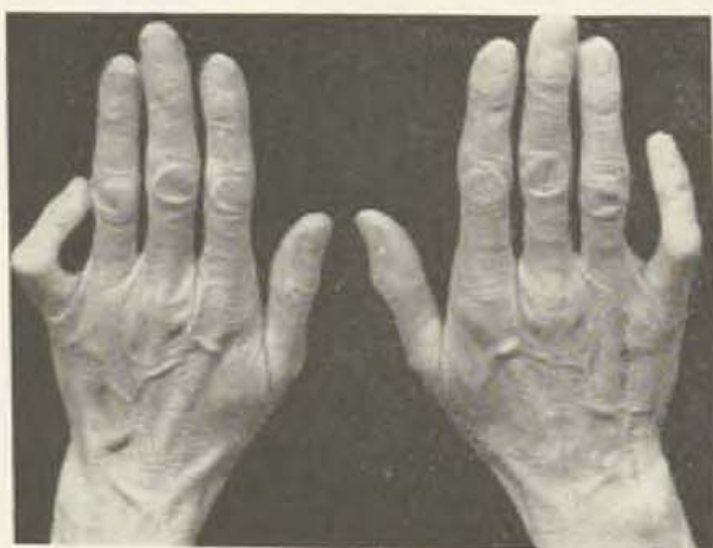


Fig. 1a.



Fig. 1b.



Fig. 2a.



Fig. 2b.

Campylodactylia is characterized by stable clinical signs, which help to determine the diagnosis. In the simplest forms the little finger is flexed in the first interphalangeal joint, the degree varying from mild flexion to a right-angled position of the joint, with compensatory hyperextension of the last and basal phalanges (Fig. 1).

In severe cases, the first interphalangeal joint of the fourth and third fingers are also affected (Fig. 2). It is characteristic of this disease that the metacarpophalangeal joint is never involved and that its movements are normal. In the severest cases all the fingers are permanently semiflexed and the hand acquires a saucerlike shape (Fig. 3a). The diameter of the fingers above the metacarpophalangeal joints is diminished as a result of involvement of the soft tissues and in some cases typical ulnar abduction of the fingers develops (Fig. 3b). The fingers are arachnodactylic, tapering off towards the tip (taper finger,



Fig. 3a.



Fig. 3b.

doigt hippocratique). In these forms the skin is usually atrophied, with effacement of the typical digital furrows.

These changes in form are sometimes accompanied by other disorders. One of the most frequent is increased sweating and poor vascularization of the hand. Vascularization is very adversely affected by cold and sometimes all the joints of a cold hand are unnaturally stiff. Another frequent concomitant sign is a



Fig. 4.

tingling sensation which develops into a dull pain even at rest. The hand is less functionally fit and because of its limited mobility the patient cannot bring the tips of the fingers together properly and dorsal flexion, supination and pronation are incomplete (Fig. 4).

Campylodactylia is divided into an early and a delayed type, according to the manifestations of the disease. In the delayed form, the patients usually report the first changes in the fingers as occurring towards the end of their fourteenth year, with maximum progression at eighteen. Most patients complain of increased sweating of the hand, sometimes of a profuse character. At school, their limited manual dexterity is manifested in the gymnastics lesson, in playing the piano, in writing on a type-writer, etc. These are the commonest complaints. The first marked signs at the age of fourteen are directly associated with the growth of the hand and with work. This was confirmed by most of those who started work for the first time and whose work placed a disproportionate strain on the congenitally inferior hand. In early forms of campylodactylia the symptoms are the same, but they appear much sooner, sometimes before the child goes to school. In these cases there is usually a familial incidence.

If all the material is evaluated from the anatomical and the functional aspect, campylodactylia can be divided into two basic forms, simple and complex



Fig. 5a.



Fig. 5b.

campylodactylia, which may be early (the first signs are evident soon after birth) or delayed (the first signs occur at about the age of fourteen). The author does not agree with the classification of Parkes Weber, who divided campylodactylia into a congenital and an acquired type.

The author classifies as simple forms of campylodactylia those characterized by flexed contracture of the fifth to the third finger (Fig. 2, 5).

Forms of contracture affecting all the fingers, giving the hand a saucer-like form, with limited mobility of all the small joints of the hand and the wrist joint, are termed complex (Fig. 3). Sometimes pronation and supination are also limited and a characteristic manifestation of this severe form is that if the hand is placed on some object for support, only the index finger and thumb are used (Fig. 6). Dorsal flexion in which the weight of the body leans on the hand is painful and the patient therefore uses the above manoeuvre to ease the discomfort.

The author regards this classification as important both from the aspect of treatment and prognosis; it has not previously been used in the literature. The aetiopathogenesis is obscure. All the available literature comment on the obscu-



Fig. 6.



Fig. 7.

riety of the origin of this disease. The chief disturbances are disturbances of the circulatory system and consequent changes in the connective tissue apparatus of the hand. These circulatory disturbances are based on the vasomotor disturbances and the author therefore presumes that functional disturbances of the autonomic nervous system play an important role in the pathogenesis of the disease. At the end of the last century it was generally held that the origin of this di-



Fig. 8.

sease was associated with an incidence of tuberculosis and rheumatic diathesis [Landouzy].

The author never found tuberculosis or rheumatic diseases in the history of any of his patients. He assumes that this view on the aetiology of the disease was related to the general frequent incidence of tuberculosis at that time, as a result of the bad social and economic conditions.

The differential diagnosis is relatively simple if it is borne in mind that patients with campylodactylia are all brought to the doctor before they are twenty, or even sooner (soon after birth in the early form). The youth of the patients almost completely excludes the possibility of its being Dupuytren's contracture. The typical thickening of the connective tissue in the subcutaneous tissue of the palm or extending up into some of the digital processes is never palpated. The possibility of prolonged muscle, tendon or nervous contracture can be excluded by the history. Some difficulty may be caused by habitual contracture or by intentional placing of the hand in such a position as to simulate contracture of unaffected fingers.

Tendovaginitis stenosans (Fig. 7) might erroneously be taken as the early form of campylodactylia, especially in children; but involvement of the thumb and tracking of the fingers differentiate it from campylodactylia.

The treatment of campylodactylia, like the question of its aetiopathogenesis, is made difficult by the great variety of its forms. Conservative and surgical

treatment are suggested. The author's experiences of treatment are not good. They are confined to isolated skin operations, which did not result in any substantial improvement. In the author's opinion and judging from the experiences of the Clinic of Plastic Surgery in Prague, operation does not yet produce any improvement.

On the contrary, in most cases it leads to deterioration of the condition, as seen in Fig. 8. In this patient (who was operated elsewhere), an attempt was made to replace the skin by transplantation of a skin flap.

CONCLUSION

It is clear that operation cannot abolish a deformity in a hand stigmatized by a disease of unknown aetiology, with an explicitly familial incidence and of an idiopathic character. The treatment cannot be radical; only palliative measures can alleviate the extreme forms of this disease in its later stages. In a hand afflicted with campylodactylia it is essential to prevent further progression, since in the author's opinion, prevention is for the time being a somewhat more effective form of treatment. It is also important to know that the placing of a disproportionate strain on the hand during the age of rapid growth which comes within school age and the period of training, very often leads to deterioration in cases of campylodactylia and causes a previously only indistinctly expressed process to spread to further fingers. These permanent changes may mean that the patient is rendered unfit for work. School doctors and labour department officials ought therefore to be informed of this disease and by providing young people who have it with suitable employment, prevent the condition from progressing further. Where signs of excessive strain have already made their appearance, the author's experiences show that a change of employment should be recommended. On the basis of clinical material, the following types of work are regarded as unsuitable: work with machines involving repeated rhythmical vibrations or jolting (tractor, hand-drill, pneumatic drill) work associated with constant flexion of several fingers or with disproportionate strain on the hand in relation to age and constitution, such as the carrying of heavy loads (work in stores of metal articles, etc.).

SUMMARY

A new classification of campylodactylia is submitted, dividing it into an early and a delayed type, with a simple or complex form of involvement of the hand. The clinical signs appearing most frequently in the differential diagnosis were determined. The obscurity of the aetiopathogenesis of the disease is stressed. The author has little experience of surgical treatment and the results in patients operated on elsewhere were unsatisfactory, sometimes ending in disablement. In general, surgical treatment is not recommended and it is considered better to concentrate on prevention and active search for these patients. No heavy strain should be placed on a hand with campylodactylia, in order to prevent the disease from progressing.

R É S U M É

Les campylodactylies (Communication préliminaire)

L. Bařinka

On propose une classification des campylodactylies d'après le type de l'éclosion précoce ou tardive, avec la forme simple ou compliquée de la main atteinte. On a fixé les symptômes cliniques qui se manifestent le plus fréquemment, avec le diagnostic différentiel. On est d'accord en ce qui concerne le fait que l'étiopathogenèse de cette maladie n'est pas éclaircie. Les expériences personnelles en ce qui concerne les interventions chirurgicales sont peu nombreuses et les résultats obtenus sur des malades opérés ailleurs sont peu satisfaisant et aboutissent souvent à invalidité. En général, on ne recommande pas le traitement chirurgical et il faut concentrer les efforts sur les mesures prophylactiques et le dépistage. La main campylodactylique ne doit pas être surmenée par le travail, pour éviter une aggravation de la maladie.

Z U S A M M E N F A S S U N G

Kampylodaktylie (vorläufige Mitteilung)

L. Bařinka

In der vorliegenden Arbeit wird eine neue Einteilung der Kampylodaktylien durchgeführt und zwar in frühzeitig beziehungsweise spät auftretende Formen mit einfachem oder kompliziertem Befallen der Hand. Es werden die am häufigsten auftretenden klinischen Symptome sowie deren Differentialdiagnose beschrieben. Allgemein wird angeführt, dass die Aetiopathogenese dieser Krankheit noch unklar ist. Die eigenen Erfahrungen mit der chirurgischen Behandlung sind bisher noch gering und die Ergebnisse bei anderswo operierten Patienten ungünstig, manchmal mit Invalidität endend. In der Literatur wird übereinstimmend eine chirurgische Behandlung abgelehnt und nur empfohlen, das Augenmerk auf die Prophylaxe und die Depistage der derart Betroffenen zu richten. Die von Kampylodaktylie betroffene Hand soll bei der Arbeit nicht belastet werden, um einem Fortschreiten der Krankheit vorzubeugen.

R E S U M E N

Campilodactilia (1.^a Parte)

L. Bařinka

Se ha llevado a cabo una nueva división de campilodactilias del tipo inicial o tardío con una forma simple o complicada en la afluencia de la mano. Se han fijado los síntomas clínicos ocurriendo con más frecuencia en la diagnosis diferencial. Se indica también en este papel que la etiopatogenesis de esta enfermedad no está clara. Hay pocas experiencias propias con un tratamiento quirúrgico y los resultados de las operaciones de los enfermos llevados a cabo en otros lugares no son satisfactorios, porque acaban en algunos casos por invalidez. En general no se recomienda el tratamiento quirúrgico, sólo es necesario orientarse a la prevención en las personas sanas y en los pacientes con estadio inicial de esta enfermedad. La mano con campilodactilia no debe trabajar excesivamente para que la enfermedad no es profundice.

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APLASIA, HYPOPLASIA AND ATROPHY OF THE FEMALE BREAST

H. PEŠKOVÁ, M. FÁRA

Inadequately developed or at a later period atrophied breasts are the cause of the bearer developing a minority complex and worrying as to how to hide the defect. In congenital aplasia of the gland, the mental state of the woman is affected not only by the cosmetic defect but also by the fear of functional inaptitude with regard to the second main task of a mother, i. e. to suckle the child she is to give birth to. Many thus affected women seek advice from the plastic surgeon who, by improving the shape of the breast, can, at least, rid them of the cosmetic defect which they are otherwise constantly aware of.

The causes leading to a conspicuously small breast are varied and the deformities can be divided into the following groups:

Aplasia or hypoplasia of congenital origin is found quite frequently and has to be distinguished from the very rare agenesis where the nipple and the areola are completely absent. In the latter the milk ridge was not formed at all during embryonic development, in the former, the development of the existing basic organ was only inadequate, the areola is small, the nipple only just indicated and the mammary gland completely absent (aplasia) or very inadequately developed (segmentary or total hypoplasia). Congenital hypoplasia of the mammary gland often coincides with other defects in the thoracic cover, particularly with hypo- or aplasia of the pectoralis major muscle and with trophic changes in the pectoral skin (Stinzing). Some authors (Henke, Lubarsch and others), therefore, speak of a triad of changes. Even the thoracic wall may be affected with defect or deformation of ribs and pulmonary herniation. Apart from aplasia of the pectoral muscles, other muscles, such as the deltoid, serratus anterior, latissimus dorsi, etc. may also be absent. In some cases developmental disorders of the arm and hand, such as hypotrophy, shortening, atypical skin folds, brachydactylia, syndactyly, etc. may be observed. Congenital hypo- or aplasia of the breast is unilateral almost without exception. Heredity is denied by all authors. The functional disorder does not always correspond with the extent of the defect; often in simple hypoplasia function is absent completely.

The etiology of the defect has not yet been clarified. Its origin is to be sought at the sixth week of foetal life when the foundations of both the mammary

gland and the pectoral muscle are laid. According to Walter, developmental arrest of the somatopleure is the basis of this defect. The cause of this arrest has not yet been discovered, but it ought to be sought among endogenous factors, whose nature is hitherto unknown.

It is interesting to note that aplasia of one breast is frequently compensated by hypertrophy of the other. Such anisomasty can also be caused by disorders of the central nervous system (lesion of the thalamus, poliomyelitis, etc.) and, maybe, uninhibiting of the sympathetic plays a part. Some authors (Kokajl et Kowalewska) consider unilateral atrophy of the mammary gland, as seen in many women with unilateral pulmonary tuberculosis, to be caused by a trophic disorder transmitted via the sympathetic.

A further group of small breasts, though functionally often quite adequate, because they possess a well developed (although very small) mammary gland, and only tissue is absent, are the so-called nipple breasts which are found both uni- and bilaterally. They indicate arrest at a certain stage of phylogenesis.

Yet another group is represented by women with marked atrophy and ptosis of the breasts developed after breast feeding which is due to excessive involution of the mammary gland. Less frequently atrophic ptosis of the breasts develops in girls shortly after puberty, although growth of the breast was normal up to that period. This disorder always affects both breasts. They look like pendulant bags and contain small and tough glands. According to endocrinologists this type of breast atrophy is due to hormonal imbalance and can, sometimes, be treated effectively with oestrogens. Experience, however, has shown that recuperation is only temporary; shortly after discontinuation of the drug atrophy sets in again. After prolonged treatment, however, the endocrinologists warn of the possibility of pathological degeneration in the direction of chronic cystic mastitis, mastodynia, adenosis and even adenocarcinoma.

The changes in endocrine activity in the organism of women after the climacteric causing glandular involution of a varied degree, may also lead to complete atrophy of the mammary gland.

Atrophic ptosis of the breasts due to metabolic disorders connected with starvation and great loss of weight, is caused by the involution of fatty tissue.

Growth of the female breast may also be inhibited by a disorder affecting the breast itself or by unsuitable local therapeutic measures applied during childhood (such as incision of infantile mastitis, excision and irradiation of benign tumours, usually haemangioma, etc.). Finally, the female breast often diminishes to a fraction of its original size after removal of part of the gland for surgical indications.

TREATMENT

In congenital defects causal treatment is out of the question. Even experiments with hormones to influence congenital developmental disorders of the female breast, have been completely abandoned. Hormone therapy in breast atrophy acquired at a later period was mentioned above.

Only reconstructive plastic surgery gives successful cosmetic results.



Fig. 1.



Fig. 2.



Fig. 3.

Fig. 1—3. Augmentation of breast with tissue from submammary region according to Longacre.

In reconstructive surgery methods using autogenous living tissue for the replacement of the missing tissue in the breast alternated, from the very beginning, with those employing plastic material. The advocates of the use of alloplastic substances point out that a considerable amount of tissue is needed to form a properly shaped breast and that this amount of tissue is difficult to obtain in thin patients apart from the disadvantage of leaving a scar at the donor site. They are, therefore, constantly searching for new substances, if possible inert to the organism. They stress the ease and simplicity of the operation and the excellent cosmetic results when using polyvinyl alcohol, polystan, polyester, polyurethane sponges, etc. However, papers have already been published by surgeons, who had used these substances, reporting elimination, years after operation, of the alloplastic material which had proved inert on experiment. Voices are even raised warning of possible cancerogenic qualities of these foreign substances, particularly of the danger on using them in the case of an underdeveloped mammary gland which is known to be especially prone to malignant proliferation. Though no case of malignant growth following implantation of alloplastic material has been reported in man, the time of observation must be considered too short to permit a definite conclusion and, therefore, it becomes highly important that every patient, in whom known plastic substances have been implanted in the region of the breast, should be consistently, regularly, thoroughly and for long periods repeatedly checked up.

For the reconstruction of an aplastic, atrophic or hypoplastic breast with autogenous tissue a number of methods have been elaborated and are being used. Some authors employ transposition of the tissue — fat plus corium — from the vicinity provided there is sufficient tissue available. Others resort to transplantation of tissue grafts taken from remote parts of the body. In 1895, Czerny transplanted a lipoma into an aplastic breast; in 1916, Wrede used fatty tissue of the abdominal skin; in 1919, Lexer published his experience with the implantation of fatty tissue into a pocket under the breast, etc.

In 1933, Burian used the layer of fat below the hypoplastic breast for its enlargement by swinging the tissue into it on one nutritive pedicle. In 1954, Longacre published his surgical procedure based on the same principle which, among many others published in recent years, proved to be the most outstanding. It provides, of course, a sufficiently thick layer of fatty tissue in the submammary region (Fig. 1, 2, 3).

In ptosis due to atrophy of the breast after puberty or breast feeding as well as in less extensive hypoplasia of the mammary gland, good results can be achieved by modelling, reinforcement, forward-shifting and fixation of the small breast in an elevated position (Fig. 4—7). The glandular and all fatty tissue must be strictly spared and after the modelling, reinforcement carried out with the preserved flaps and bands of corium sutured together in several layers with catgut stitches. Thus, it is possible to form a breast which will be more prominent, elevated and of a more natural appearance. The surplus of skin, but only its epidermal layer, is then removed by an excision whose suture lines form an inverted T, one branch of which runs vertically from the areola to the



Fig. 4.



Fig. 5.

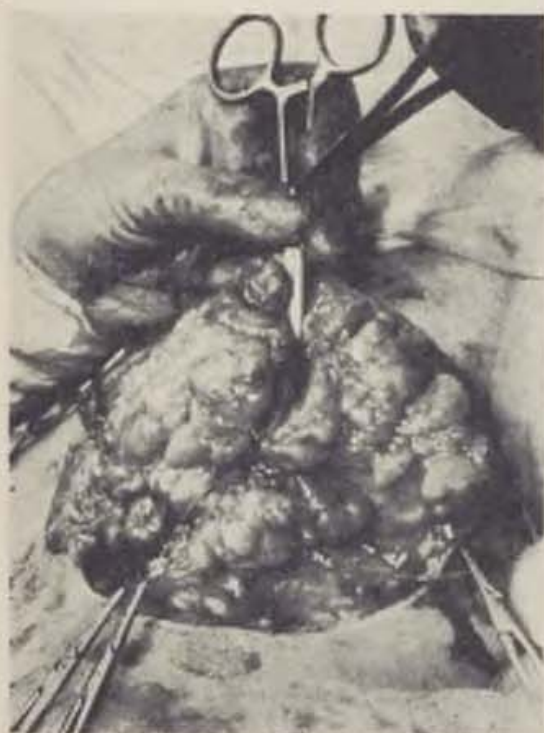


Fig. 6.



Fig. 7.

Fig. 4—7. Modelling and reinforcement of an atrophic and ptotic breast.



Fig. 8.



Fig. 9.

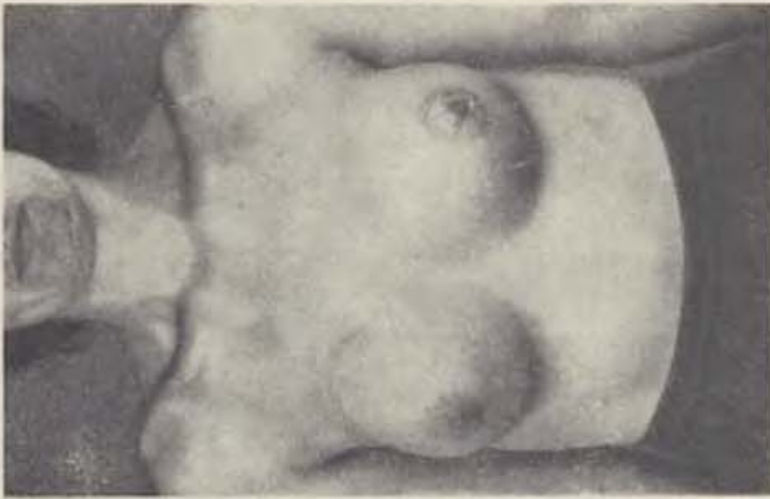


Fig. 10.

Fig. 8.—10. Enlargement of breasts by implantation of fat-corium bands taken from the gluteal region.

lower margin of the breast, the other at right angles to it along the lower breast margin. Thus the resulting scar is of no cosmetic significance. In 1930, Gläsmér, who found that the breast looked fuller when elevated, elaborated his own method and after him other authors used similar techniques with tucking, rolling up and reinforcement of the gland.

For the enlargement of an aplastic or hypoplastic breast transplanted fat plus corium excised from remove parts of the body, is extremely suitable. The



Fig. 11.



Fig. 12.

Fig. 11—12. Transplantation to the hypoplastic breast of part of tissue excised from the hyperplastic breast.

tissue is excised in the shape of bands which are then moulded, implanted under the remnants of the mammary gland and fixed to the fascia. These tissue bands may be taken from the abdominal skin or the gluteal region (Fig. 8—10), the latter site being more suitable because its skin has a thicker layer of corium, the fatty tissue is firmer and the scars, resulting from the excision, provided correct choice of the donor site, are fine, smooth and inconspicuous when running along the gluteal groove. The extent to which the transplanted fat is absorbed, can be lessened by two-stage transplantation according to Peer. In the first stage, he only mobilizes the tissue band leaving it connected with the donor site by a nutritive pedicle. Some weeks later, when the fat has become thicker and firmer, he carries out the actual transplantation. Peer's method is suitable particularly in cases where the skin, covering the breast, is under tension and, therefore, the transplant exposed to considerable pressure which promotes absorption of fat.

In unilateral aplasia or hypoplasia of the breast, where the other breast shows compensatory hypertrophy, enlargement of the smaller breast can be carried out by implantation of tissue excised from the hypertrophic breast (Fig. 11, 12). In our six patients operated on by this method the take of the transplanted tissue was always uneventful and subsequent absorption negligible. We have abandoned this method, however, because we cannot exclude the danger of the transplanted tissue degenerating into a malignant growth.

A large amount of fat plus corium can be transplanted by way of a tubed flap transposed from a remote part of the body. The great advantage of this method is both negligible absorption of fat after transplantation and the possibility of augmenting the skin cover of the breast if primarily underdeveloped in a case of aplasia or debased by scars resulting from previous operations. The pedicle graft is freed of its epithelium and modelled into the required shape prior to its implantation into the subcutaneous bed in the breast.

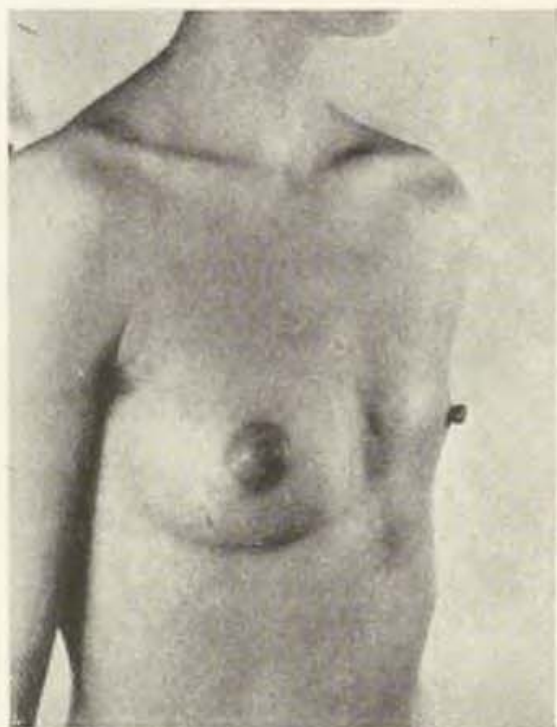


Fig. 13.



Fig. 14.

Fig. 13—14. Nipple breast enlarged with fat-corium grafts.

EXPERIENCE OF THE CLINIC OF PLASTIC SURGERY IN PRAGUE

A case of complete agenesis of the breast with no trace of nipple and areola, has never been seen at the Clinic.

A total of 52 women were operated on for unilateral aplasia or hypoplasia, in 12 of whom malformations of the ribs, such as narrowing, alteration of course, flattening and partial defect, were found on X-ray and 2 women showed concomitant deformities of the ipsilateral hand (brachydactylia, syndactyly); in 18 patients the pectoralis major was affected. Atrophic ptosis of the breast originating from breast feeding was operated on in 44 patients. A series of 11 patients suffered from a hypoplastic breast due to surgery or actinotherapy applied to the region during childhood. One woman was operated on for a unilateral nipple breast (Fig. 13 and 14).

We prefer transplantation of autogenous tissue to the implantation of alloplastic material. A free fat-corium graft is usually taken from the gluteal region just above the gluteal groove, so that the resulting scar comes to lie within this groove and thus becomes inconspicuous.

In 48 patients, in whom the breasts had atrophied after breast feeding, we performed modelling, reinforcement and fixation of the gland and resection of the surplus skin.

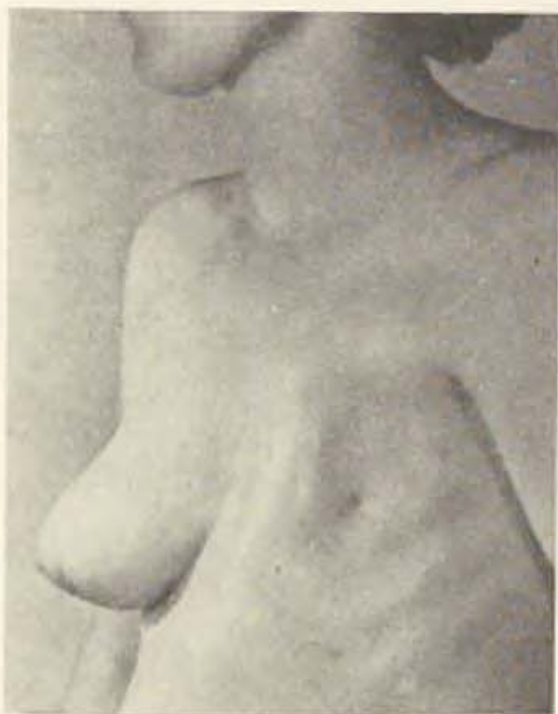


Fig. 15.



Fig. 16.

The healthy breast was diminished to the size of the somewhat hypoplastic other one, in 20 patients.

In 3 cases tissue of the submammary region was transposed to the breast on an external pedicle according to Burian.

Transposition of tissue from the submammary region on a median pedicle according to Longacre, was performed in 8 patients.

One-stage free transplantations of fat-corium bands were carried out in 14 women, in 4 of whom the operation had to be repeated because of partial absorption of the transplant, and in 3 even carried out a third time.

Two-stage transplantation of tissue from the gluteal region according to Peer was performed in 5 women.

Transplantation of tissue excised from the hyperplastic breast and implanted into the hypoplastic breast was carried out in 6 women.

Only in 3 patients did we use alloplastic material.

In one girl, aged 16, complete aplasia of the breast combined with a large defect of the pectoral muscle and partial defect of ribs, two migrating tubed pe-

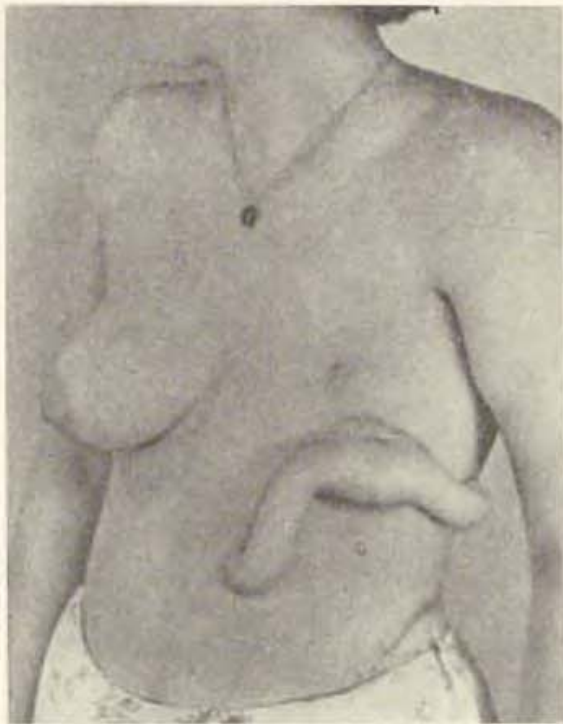


Fig. 17.



Fig. 18.



Fig. 19.

Fig. 15—19. Severe plasias of breasts combined with defect of pectoralis major and deformity of ribs. Tubed flaps formed from abdominal skin and deprived of epithelium fill depression in thorax; some skin had been left on the flaps to augment the too tight skin over the breast. Condition after implantation of alloplastic inlay.

dicle flaps of abdominal skin were used. Fig. 15—19 show that the tissue of both tubed flaps just sufficed to fill the deep depression whose skin, previously fixed to the deformed ribs, had to be mobilized over a broad area to form the implantation bed for the transplants. The shape of the breast is still inadequate although some skin was left on the flaps to augment the rather tight cover of autochthonous skin. Implantation of the flaps not only resulted in filling the depression, but the skin also became more mobile, stronger and of a better quality, and after a course of massage it was possible to implant a dilating inlay of alloplastic material.

RESULTS AND COMPLICATIONS OF OPERATIONS

The cosmetic results of all methods are very good, the best however, are those after transplantation of fat-corium flaps according to Longacre and Burian.

Complications were registered in 6 patients in whom the fat was partially eliminated after varying periods (3, 6, 7, 5, 4 and 9 weeks resp.), without any signs of suppuration. In one case an inlay of rigid alloplastic material had to be removed after several years because it caused painful sensation of pressure in the breast, and was replaced by autogenous tissue.

SUMMARY

Inadequately developed or at a later period markedly atrophied breasts, which lead to the bearer developing a minority complex and worrying as to how to hide the defect, are an indication for plastic surgery. After grouping the various conditions into agenesis, aplasia, hypoplasia, conditions based on hormonal or metabolic disorders, arising from surgical and other treatment of the breast during childhood, etc., the authors deal with the possibility of plastic reconstruction and report on the experience and good results in 108 women operated on at the Clinic of Plastic Surgery in Prague, Czechoslovakia. This Clinic gives preference to autogenous over alloplastic material.

RÉSUMÉ

Aplasie, hypoplasie et atrophie du sein de la femme

H. Pešková, M. Fára

Le développement rudimentaire ou bien une atrophie des seins se présentant plus tard et provoquant, chez la femme, des sentiments d'infériorité et des soucis en tant que vice caché, constituent une indication pour une intervention chirurgicale plastique. Après avoir présenté une classification de ces déformations (agénésie congénitale, aplasie et hypoplasie, s'étant développées à cause d'un déséquilibre hormonal ou bien à la suite de certains troubles métaboliques, d'opérations chirurgicales ou d'autres interventions thérapeutiques, réalisées pendant l'enfance pour guérir des maladies des seins), les auteurs discutent les possibilités des remplacements plastiques en communiquant les expériences qu'ils ont acquises eux-mêmes sur 108 femmes opérées à la clinique de chirurgie plastique à Prague, où on préfère l'autogreffe à l'utilisation du matériel alloplastique.

ZUSAMMENFASSUNG

Aplasie, Hypoplasie und Atrophie der weiblichen Brust

H. Pešková, M. Fára

Eine ungenügende Entwicklung oder eine später aufgetretene auffallende Atrophie der Brust, die den betroffenen Frauen Minderwertigkeitsgefühle verursachen und Sorgen mit dem Verbergen der Störung bereiten, bilden eine Indikation für den plastisch-chirurgischen Eingriff. Die Verfasser teilen die Störungen in angeborene (Agenese, Aplasie und Hypoplasie), hormonal bedingte, auf Stoffwechselstörungen beruhende und solche ein, die durch einen Eingriff oder eine andere Behandlung von Brusterkrankungen in der Kindheit bedingt sind. Die Verfasser erörtern die Möglichkeiten eines plastischen Ersatzes und berichten über Erfahrungen und günstige Ergebnisse bei 108 Frauen, die an der Klinik für plastische Chirurgie in Prag operiert wurden; diese Klinik zieht die Autotransplantation der Verwendung von alloplastischem Material vor.

RESUMEN

Aplasias, hipoplasias y atrofas mamarias

H. Pešková, M. Fára

Un desenvolvimiento insuficiente o una atrofía prominente del seno, que causa a las mujeres un complejo de inferioridad y las preocupa de como esconder este defecto, lo representa una indicación a efectuar una intervención plástico-quirúrgica. Después de haber dividido los defectos (es decir, de la agenesis congénita, de las aplasias y hipoplasias las cuales surgieron a base de las hormonas, durante los trastornos metabólicos, después de las intervenciones y tratamiento de las enfermedades del seno en la infancia) los autores se ocupan de la posibilidad de emplear una substitución plástica y nos informan sobre las experiencias y resultados buenos alcanzados en 108 mujeres que fueron operadas en la Clínica de la Cirugía Plástica de Praga, lo que da preferencia al empleo de la autotransplantación en comparación de la utilización del material aloplástico.

REFERENCES

1. Bames, H. O.: Plast. reconstr. Surg. 11, 5, 404—412, 1953.
2. Burian, F.: Čas. Lék. čes. 73, 14, 373—377; 397—401, 1934.
3. Conway, H., Smith, J.: Plast. reconstr. Surg. 21, 1, 8—19, 1958.
4. Edgerton, M. T., Mc Clary, A. R.: Plast. reconstr. Surg. 21, 4, 279—305, 1958.
5. Edgerton, M. T., Meyer, E., Jacobson, W. E.: Plast. reconstr. Surg. 27, 3, 279—302, 1961.
6. Gonzales-Ulloa, M.: Plast. reconstr. Surg. 25, 1, 15—26, 1960.
7. Longacre, J. J.: Plast. reconstr. Surg. 11, 5, 380—403, 1953.
8. Longacre, J. J.: Plast. reconstr. Surg. 17, 5, 358—366, 1958.

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Director: Doc. V. Kubáček, M. D.

MODIFICATION OF THE VOMER FLAP FOR CLOSING THE NASAL FLOOR IN COMPLETE CLEFT

V. KUBÁČEK

The early and late results of suture of the lip in complete clefts still cannot be regarded as entirely satisfactory. The difficulties arising in the surgical reconstruction of the continuity of the lip, the nostril and its floor and the modelling of the alae nasi, clearly confirm the contention of Academician Burian that we are not dealing merely with the simple non-union of parts destined to form the lip, nose and jaw, but with a severe deformation based on hypoplasia of the soft tissues and deeper parts. Czechoslovak plastic surgery is, on the whole, overcoming these difficulties successfully as a result of its consistent physiological approach and the wide experience of our leading plastic surgeons.

In recent years, attention has been concentrated in the world literature on the correct forming and functional reconstruction of the continuity of the lip (Millard, Tennison) and the alae nasi, where in unilateral complete clefts, the cartilaginous base of the tip of the nose is so deformed as to be almost irreparable.

The lack of material for reconstruction, however, is not felt here so severely as in the reconstruction of the floor of the nose where we must replace the mucous membrane of both the nasal and oral cavities. The Achilles heel is the space between the pole of the intermaxillary bone and the anterior pole of the alveolar process on the affected side which is usually situated very posteriorly. If the space in the region of the foramen incisivum is not well primarily reconstructed and epithelialized, spontaneous secondary healing leads to shrinkage of the scar. Its tension then has an unfavourable effect on the mutual position of the poles of the cleft's maxillary arch, leading to difficulties in orthodontic treatment, and also causes considerable narrowing of the nostril and the nasal cavity which in turn affects the form of the alae nasi and upper lip. For these reasons we cannot underestimate the importance of the problem of the correct reconstruction of the nostril and its floor and must consider it to be a dialectically inseparable part of the suture of the lip. Special care has, therefore, been devoted to the reconstruction of the nostril and its floor in our clinic.

OUR METHOD

For a number of years we used the principle of the method of Veau for the reconstruction of the floor of the nostril, as modified by Karfík. The mucous membrane of the nostril and the floor of the nose was formed out of mucous membrane from the vestibule of the nose (both from the nasal septum and the alae nasi), from the mucous membrane of the vomer and from the nasal mucosa of the palatine bone of the side of the cleft. The vomer mucosa was widely mo-



Fig. 1.

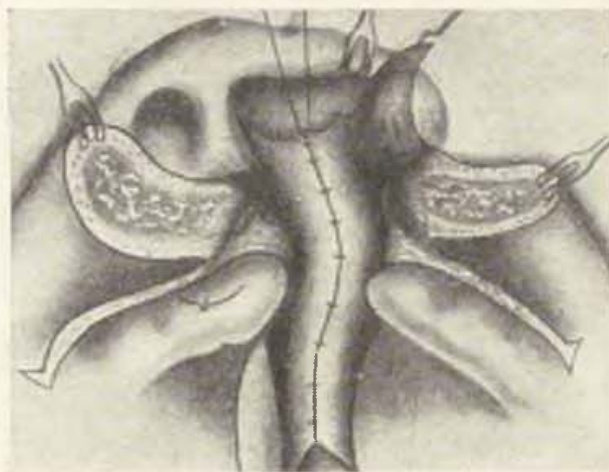


Fig. 2.

bilized to the whole extent of the vomer. The diagonal incision was made at its posterior edge running posteriorly and cranially so that it could be swung to the side of the cleft. Sufficient material for reconstruction was thus obtained (Fig. 1, 2). In the vestibule of the nose, where the edge of the mucosa from the nasal palate passes into the mucosa of the alae nasi there is always considerable shortening causing asymmetry of the insertion of the alae nasi in a distal and posterior direction. An incision was, therefore, made immediately under the alae nasi, obliquely across the edge of the mobilized mucous membrane thereby obtaining a shift forward and proximally. The mucous membrane thus mobilized was sutured linearly. We have recently covered the sutures on the oral side with a Burian flap from the vestibular mucous membrane of the lip. We find the Burian flap a considerable contribution to resolving the problem of the epithelization of the reconstructed nostril in a high proportion of cases.

Four years ago we changed our method of reconstruction of the floor of the nostril for reasons given in the discussion. We now mobilize the mucous membrane of the vomer to the smallest possible extent in the form of a small wedge which is lifted immediately behind the intermaxillary bone, with its base towards the mucous membrane of the nasal septum. The wedge is then swung round its base and fitted into the wide gap left after incising the shortened edge of the mobilized mucous membrane covering the nasal surface of the palatine process of the maxilla where it passes into the vestibular mucous membrane of the alae nasi of the side of the cleft under the so-called vestibular fold. The resulting

suture-line in this method is Z-shaped and not linear (Fig. 3, 4, 5, 6, 7). On the oral side the suture-line is covered by the widely mobilized vestibular mucous membrane from the lip.

DISCUSSION

We arrived at the new method of closing the floor of the nose after considering some disadvantages of our previous method. First, early-operative follow-up showed regular dehiscence of the sutures of the vomer and nasal

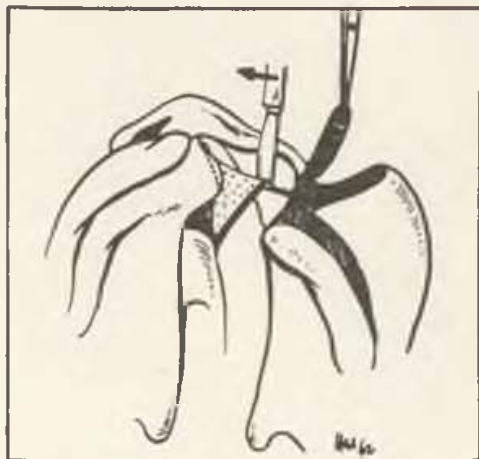


Fig. 3.

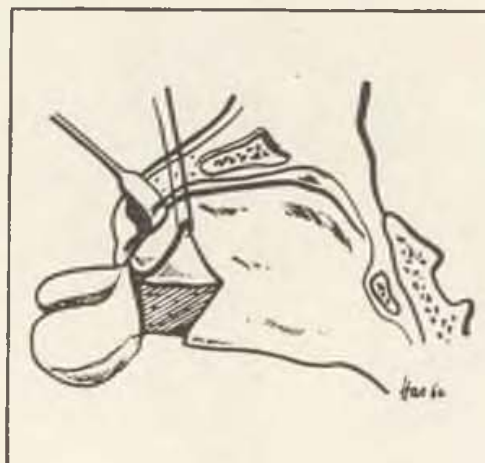


Fig. 4.

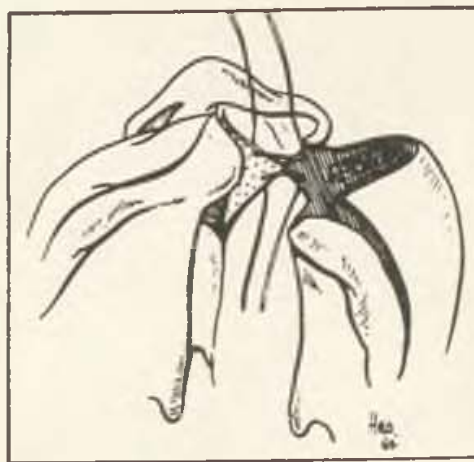


Fig. 5.

mucous membrane for the extent of the hard palate, repeatedly pointed out to us by our orthodontist. Only the suture between the two poles of the cleft jaw remained intact. We, therefore, concluded that so wide a mobilization of the vomer mucous membrane, which completely uncovered the cartilaginous base of the vomer causing its traumatization, is unnecessary. Secondly, on late follow-up, we found stenosis of the nostril in a considerable proportion of the operated children. The base of the alae nasi was often drawn out proximally and badly formed. By mobilizing the vomer mucous membrane to the smallest possible



Fig. 6.



Fig. 7.

Fig. 6. Wedge shaped vomer flap in operated area. — Fig. 7. Lifted vomer flap, the end of which is held by forceps and denuded cartilage of vomer visible.

extent in the form of a wedge we cut out unnecessary large and traumatizing mobilization of the mucous membrane of the whole vomer.

We consider the development of stenosis of the nostril to be due to the linear suture in the old method of closing the floor of the nose. The Z-suture of the reconstructed mucous membrane of the nostril formed by fitting a wedge of vomer mucous membrane on the other hand, prevents the developing of stenosis. In addition, the wedge of vomer mucous membrane provides the lacking reconstruction material in the most difficult part of the suture of the lip. The newly formed floor of the nostril, epithelialized orally by shifting the vestibular mucous membrane of the lip, prevents not only stenosis of the nostril but also makes the later suture of the palate easier technically in the anterior pole of the cleft, and is thus a prevention against so-called anterior perforation in suture of the cleft palate. The follow-up of children whose lips were sutured by this method three and four years previously and who are now returning for operation of the palate confirms this opinion (Fig. 8, 9, 10, 11 and 12).

The deep transverse incision made in the edge of the mobilized nasal mucous membrane under the vestibular fold is a further advantage of the new method. It to a great extent frees the ala nasi which was pulled into the cheek so that it is easily shifted forward and medially, making it possible to suture the musculature of the lip almost without tension. This is of great significance in wide unilateral complete clefts.



Fig. 8.



Fig. 9.



Fig. 10.

Fig. 8—10. Bilateral complete cleft prior to and after operation.

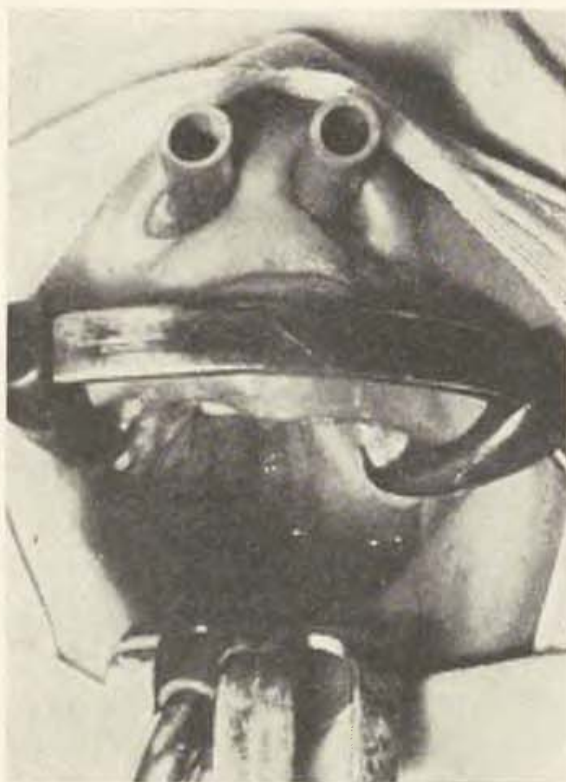


Fig. 11.



Fig. 12.

Fig. 11, 12. On plates the satisfactory passage through nasal openings and nostrils is apparent into which rubber tubes of large diameter can be inserted.

CONCLUSION

Our modification of the vomer flap thus removes some disadvantages of our previous method of closing the floor of the nose. First of all, large and traumatizing mobilization of the vomer mucous membrane is not necessary. The wedge of vomer mucous membrane, which is used to close the floor of the nose in the new method, solves the problem of the lack of reconstruction material and, together with the incision of the nasal vestibular mucous membrane below the vestibular fold, makes it possible to use a Z-suture which prevents later stenosis of the nostril and nasal cavity. The possibility of primary epithelization of the reconstructed floor of the nose facing the mouth cavity prevents healing by second intension and a contracting scar which can have a bad effect on the position of the poles of the cleft maxilla and make orthodontic treatment difficult. From the technical aspect also, primary epithelization makes later suture of the palate easier in the anterior pole of the cleft and thereby prevents so-called anterior perforation of the suture of the palate. A further important advantage is the deep transverse incision of the vestibular mucous membrane under the vestibular fold which makes it possible to suture the lip musculature almost without tension.

SUMMARY

A new method is described of closing the floor of the nose in suture of the lip in complete clefts. Instead of large and traumatic mobilization of the mucous membrane of the vomer, the new method consists in raising a small wedge of vomer mucous membrane behind the intermaxillary bone which is fitted into the gap left after a deep incision in the mucous membrane of the nasal vestibular fold. This makes a Z-shaped suture possible instead of the linear suture which leads to subsequent stenosis of the nostril. At the same time it facilitates the epithelization of the relatively small wound area at the floor of the nose facing the oral cavity, with vestibular mucous membrane from the lip. The new method of closing the floor of the nose is a modification of the vomer mucous membrane flap and is an attempt to solve the problem of the lack of reconstruction material on closing the floor of the nose in complete clefts. It prevents later stenosis of the nostril and nasal cavity, creates the best conditions for orthodontic treatment and makes it possible in most cases to suture the lip musculature without tension. This new method also creates the best conditions for later suture of the anterior pole of the cleft palate and in this way is a prevention of anterior perforation in suture of the palate.

RÉSUMÉ

Modification du lambeau du vomer, utilisé pour la fermeture des fosses nasales lors des becs-de-lièvre et fissure palatine totaux

V. K u b á ě k

Description d'une méthode nouvelle pour la fermeture des fosses nasales, pour pratiquer la suture des lèvres en présence d'un bec-de-lièvre total. Le principe de cette méthode nouvelle consiste en ce qu'au lieu de la mobilisation importante et traumatisante de la muqueuse du vomer, on ne soulève qu'un petit coin de la muqueuse du vomer, en arrière des prémaxillaires et qui s'insère dans une incision profonde de la muqueuse vestibulaire au-dessous du pli vestibulaire. De cette façon, il est possible de réaliser, à la place de la suture linéaire qui produit plus tard une sténose des narines, une suture sinueuse et en même temps, on facilite l'épithélisation de la surface relativement petite de la plaie de la fosse nasale, en direction orale, par la muqueuse vestibulaire des lèvres. Cette nouvelle méthode de la fermeture de la fosse nasale représente une modification du lambeau de la muqueuse du vomer qui tâche à surmonter les difficultés qui se présentent à cause du manque du matériel de reconstruction lors de la fermeture de la fosse nasale, en présence d'un bec-de-lièvre total. Elle prévient la formation des sténoses ultérieures des narines et des mœurs nasaux, tout en créant des conditions plus favorables au traitement orthodontique et en rendant possible une suture de la musculature des lèvres, le plus souvent sans tension. La modification nouvelle de la fermeture de la fosse nasale à l'aide du lambeau de la muqueuse du vomer modifié réalise également des conditions meilleures pour la suture ultérieure de la fissure de la voûte palatine à son pôle antérieur et constitue, dans ce sens, une mesure prophylactique contre les dites perforations antérieures de la suture du palais.

ZUSAMMENFASSUNG

Modifizierung des Vomer-Lappens beim Verschluss des Nasengrundes bei totalen Spaltbildungen

V. Kubáček

In der vorliegenden Arbeit wird eine neue Art des Nasengrundverschlusses bei der Lippennaht bei totalen Spaltbildungen beschrieben. Das Prinzip der neuen Methode besteht darin, dass anstelle einer ausgedehnten und traumatisierenden Mobilisierung der Vomerschleimhaut nur ein kleiner keilförmiger Abschnitt der Vomerschleimhaut hinter dem Zwischenkiefer abgehoben und in einen tiefen Schnitt in der Schleimhaut des Nasen vestibulums unter der Vestibulärfalte geschoben wird. Auf diese Weise wird anstatt einer linearen Naht, die später eine Stenose des Naseneingangs verursachen kann, eine Zickzacknaht ermöglicht; gleichzeitig gestattet diese Methode die Epithelisierung der verhältnismässig kleinen Wundfläche des Nasengrundes in oraler Richtung durch die Vestibulärschleimhaut der Lippe. Die neue Methode des Nasengrundverschlusses ist eine Modifikation des Vomerschleimhautlappens und stellt den Versuch dar, den Mangel an Rekonstruktionsmaterial bei Verschluss des Nasengrundes bei totalen Spaltbildungen zu beseitigen. Sie beugt einer späteren Stenose des Naseneingangs und Nasengangs vor, stellt bessere Bedingungen für die orthodontische Behandlung her und gestattet in den meisten Fällen die Naht der Lippenmuskulatur ohne Spannung. Die neue Methode des Nasengrundverschlusses mit Hilfe des modifizierten Vomerschleimhautlappens führt auch bessere Bedingungen für die spätere Naht der Gaumenspalte an ihrem vorderen Pol herbei und stellt in diesem Sinne auch eine Prophylaxe der sogenannten vorderen Gaumennahtperforationen dar.

RESUMEN

Modificación del lóbulo de vomer en la clausura de la parte inferior de la nariz en fisuras generales

V. Kubáček

En este papel se describe un nuevo método de la clausura de la parte inferior de la nariz en la sutura de los labios en fisuras generales. El nuevo método consiste en el hecho de que en lugar de una gran movilización de la mucosa de vomer con efecto traumático detrás del hueso intermaxilar está alzado sólo un pequeño calzo mucoso de la mucosa de vomer el que se mete en una profunda incisión en la mucosa nasal vestibular bajo la pestaña vestibular. De esta manera, en vez de la sutura lineal que causa más tarde una estenosis de la apertura nasal, es posible hacer una sutura sinuosa y al mismo tiempo se logra la epitelización de un área precoz considerablemente pequeña de la parte inferior de la nariz con la dirección a la mucosa vestibular oral del labio. El nuevo método de la clausura de la parte inferior de la nariz es una modificación del lóbulo mucoso de vomer y representa un experimento de resolver la insuficiencia del material para reconstrucción de la clausura de la parte inferior de la nariz en fisuras generales. Es también una prevención contra estenosis consecuentes de la apertura y el tránsito nasales, crea mejores condiciones para el tratamiento ortodóntico y posibilita hacer la sutura de los músculos labiales en la mayoría de los casos sin tensión. El nuevo método de la clausura de la parte inferior de la nariz con ayuda del lóbulo mucoso modificado de vomer también crea mejores condiciones para la sutura consecuente de la fisura palatina en la parte delantera de las llamadas perforaciones delanteras de la sutura del paladar.

REFERENCES

1. **Burian, F.:** Surgery of Cleft Lip and Palate. Stát. zdrav. nakl., Praha 1954.
2. **Karfík, V.:** personal communication.
3. **Millard, D. R.:** Plast. reconstr. Surg. 25, 595, 1960.
4. **Plessier, P.:** Traitement du bec-de-lièvre unilatéral, procédé du Dr. Veau, Masson, Paris 1931.
5. **Tennison, C. W.:** Plast. reconstr. Surg. 9, 115, 1952.

(Doc. V. Kubáček): Tábor 42 A, Brno, Czechoslovakia

BOOKS

Klen, R.: **Preparation and Conservation of Tissues.** Státní zdravotnické nakladatelství (State Medical Publishing House), Praha; 316 pages.

The recently published Russian translation of Dr. Rudolf Klen's book "Preparation and conservation of Tissues" deals with one of the topical problems of modern biology and medicine.

The author, for the first time, has attempted to unite the numerous and incoordinated material published by various authors, generalize his own observations in the subject under consideration and elaborate a basic manual which will help in further expounding the problem. It is gratifying to notice that the author of this book is recognized as a great specialist in the field of conservation and transplantation of tissues. The name of Dr. Klen is widely known by specialists of many countries because of his systematic papers published in the medical press.

In the manual an analysis is made of the experience derived from the work of the Hradec Králové (Czechoslovakia) Tissue Bank and its scientific achievements are compared with those of specialists of many

countries. The present-day problems of preparation and conservation of tissue are dealt with on a high level of theoretical and clinical knowledge. The author also describes extremely helpful methods in lifting and conserving the various tissues.

The monograph will serve as a practical guide for medical students dealing with this subject; in this lies its main value.

We do not intend to give a detailed analysis of the whole monograph under review; we only want to take into consideration the most important questions which are of theoretical or practical significance.

In the preface, written by Prof. N. P. Novatchenko, merited scientist and corresponding member of the Academy of Medical Sciences of the U.S.S.R., it has been pointed out that the aim of this book is to fill the gap of knowledge about some unsolved problems.

The book under review consists of 16 chapters different in size, an index of references and an appendix of illustrations. In a special chapter the author dwells at length on the various sources of tissue specimens with regard to the age of the donor, the presence of malignant neoplasms,

infections, etc. These sections are full of many-sided factual material and are, therefore, of great practical value.

Particularly interesting are the data on the survival of tissues undergoing conservation. Using the original electrophysiological method for the determination of tissue viability, jointly elaborated with Kryšpín. Klen made a number of observations whose analysis permitted the well-founded conclusion that it was expedient to introduce the above mentioned method into wide clinical practice.

The author's conception of transplant viability is founded in the light of modern ideas on the preservation of biological activity of cell elements in conserved tissues. According to this conception a transplant is regarded viable, if its metabolism does not suffer irreversible changes as compared to the metabolism of the same tissue in a healthy organism and which, therefore, is capable of normal growth and regeneration under favourable conditions. As is shown by the author, obtaining tissue of good viability does not present great difficulties, particularly if it is taken from voluntary donors or cadavers. It is important to know the time limit of survival of each tissue after the onset of biological death of the individual.

A special chapter of the book is dedicated to zoogenous tissues. With good reason the author asserts that the successful solution of the problem of transplanting heterogenous tissues is unthinkable without elucidating the cause of incompatibility. On the example of the transplantation of conserved cancellous bone of the shoulder blade of young calves, the importance of the biological qualities of heterogenous transplants is convincingly demonstrated. Clinical observations have proved how well these conclusions are founded.

The chapter dealing with the observance of proper conditions on lifting tissues from cadavers, is fully comprehensive. Here important practical advice and recommendations are given as to the preparation of the cadaver, where to place it, what instru-

ments to use, how to apply towellings, and the problem of how to safeguard sterility of the specimens, is dealt with.

We wish to draw attention to some special parts of the book dealing with the preparation of tissues. Very well described is the rinsing equipment which is used for the removal of metabolites from the tissues and thrombi from blood vessels.

One chapter deals in detail with the practical measures aimed at counteracting the after-effects of lifting the tissue. Unfortunately, extraction of the spinal cord from the spinal canal is described here quite out of place, because this chapter is supposed to deal with the question of how to counteract the sequelae of lifting the tissue and not with the methods of lifting themselves.

Particularly valuable is the chapter dealing with conservation of tissues which gives an account of the author's great experience in the matter. This, we think, is the most interesting part of the book. The methods of tissue conservation which guarantee preservation not only of the morphological structure, but also of the biological qualities of the tissues, are described therein.

Chemical conservation, immersion in „plastmassa“, cooling and freezing are dealt with in detail. The method of tissue lyophilization finds positive appraisal.

Taking into account the latest scientific achievements and his own numerous observations, Klen explains the nature of a number of morphological, physiological, chemical, physico-chemical and biological changes taking place in tissues on preparation and storage.

The immunological tendencies and the marked-out route by which to overcome tissue incompatibility, are dealt with in the chapter headed "Transplant-antigen". Lowering the antigenic activity of a transplant is the way which will have to be taken in experiments aimed at achieving a stable take of transplanted tissues. The first step to be made in this direction is the investigation of the special relationship between the same kind of tissues in the different

species. The second step then appears to be the artificial lowering of antigenic activity.

In the following chapters much attention is paid to some important practical questions: how to judge the suitability of a transplant, the transport of tissue to hospitals and clinics, and stock-taking and book-keeping. The conclusion of the book contains instructions about the care of the refrigerators.

On the whole, the book is well edited and richly illustrated with numerous, beautifully executed drawings and diagrams.

Although the book must be evaluated positively, nevertheless, it is necessary to mention some of its shortcomings. So, for instance, we judge the lack of information about the organizational and methodical structure of laboratories for tissue conservation to be a serious omission. These laboratories are entrusted with undetermined tasks. There are also some misprints, which, most probably, are not only the author's responsibility. However, the mentioned shortcomings are not of a fundamental character and do not lessen the high scientific and practical value of the monograph.

We consider it appropriate to stress particularly that the Czechoslovak Medical Publishing House and the author of the

book have done a great and useful deed in acquainting the Soviet specialists with the achievements in the given field made in the fraternal country. We are deeply convinced that the publication of this monograph in Russian will become a strong stimulus even to Klen and his colleagues who consider it indispensable to get acquainted in more detail with the Russian literature and achievements in this field. A useful arrangement could be materialized by personal contact of the specialists of both countries and also by the exchange of books which also in future ought to be translated both from Czech into Russian and from Russian into Czech.

In conclusion, it should be said that the book is written in good literary language and is easily readable which to a great extent is contributed to by the good translation of Dr. A. Schierová. The manual "Preparation and Conservation of Tissues" is a great contribution to the solution of the problem of transplantation of tissues and organs. It has filled a gap which, up to then, had existed in the Russian and foreign literature. The book will serve as a manual for the practical work both of surgeons and theoreticians engaged in transplanting tissues.

Prof. P. P. Kovalenko, Doc. N. P. Demitchev

ANNOUNCEMENTS

At the Meeting of the Brazilian Society of Hand Surgery [Sociedade Brasileira de Cirurgia da Mão], held in August 1963, the following officers were elected for the period of 1963—1965.

President: Dr. Henrique Bulcão de Moraes
1º Vice-President: Dr. Orlando Graner
2º Vice-President: Dr. José de Silva Rodrigues
General Secretary: Dr. Odilio Silva
1º Secretary: Dr. José Juvenil Teles
2º Secretary: Dr. Diomede Belliboni
Treasurer: Dr. José C. Estrada

Executive Committee: Dr. Arcelino Bittar, Dr. Danilo Gonçalves, Dr. Ivo Pitanguy, Dr. Lauro Barros de Abreu, Dr. Alipio Pernet.

Address of the Society: Avenida Churchill 97 - 10º, Rio de Janeiro, BRASIL.

The 1st Spanish Congress of Plastic and Reconstructive Surgery, organized by the Spanish Society of the same name, will take place in Madrid from May 24—28, 1964. The organization committee is as follows:

President: Dr. Benito Vilar-Sancho, Vice Pres.: Dr. Luis Alvarez-Lowell, Secretary General: Dr. Fernando Enriques de Salamanca, Treasurer: Dr. Miguel Alonso-Artieda.

The official themes of the congress will be: Reparative Surgery of the Hand, Cosmetic Surgery, Traffic Accidents.

The organization committee, hoping for the most extensive collaboration, has invited the members and representatives of many plastic surgery societies to the congress. Information, as well as the provisional program, may be obtained from the secretary general, Dr. Fernando Enriquez de Salamanca, Pabellon 1 de la Facultad de Medicina, Ciudad Universitaria, Madrid 3, Spain.