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The 30th Anniversary of the Slovakian National Uprising

All the people of Czechoslovakia recall at present the 30th anniversary of a historic event, the Slovakian National Uprising. Together with the May Uprising of the Czech people in 1945, it has been one of the chief exploits in the struggle of the Czechs and Slovaks against the German fascism and for national liberation. In this uprising the future of the Slovakian nation and indeed of all Czechoslovakia, was decided. An important factor in the Slovakian National Uprising was the internationalism which manifested in military- and material aid afforded by the Soviet Union and by the participation of Czechs as well as other nations in the combat — antifascist Germans, Poles, Frenchmen, Bulgarians and Hungarians.

The Slovakian National Uprising marks a new historic stage in the building up of the CSSR as a peoples democracy and as a socially just, federal state of Czechs, Slovaks and other nationalities.

The editors

ACTA CHIRURGIAE PLASTICAE — *16*, 1974, No. 3

Priorov Central Institute of Traumatology and Orthopaedics, Moscow (USSR)
Director Prof. M. V. Volkov, Academician of Soviet Academy of Medical Sciences

BIOLOGICAL PROPERTIES OF BONE TISUE CONSERVED IN PLASTIC MATERIAL AND STERILIZED WITH GAMA RAYS

(Clinico-experimental study)

A. S. IMAMALIEV, R. R. GASHIMOV

Reconstructive surgery of the locomotor system, at the present stage of development, stands in need of material for transplantation, a material which is of biological origin. This is obtained by preparation from people who have died recently and is then stored by various methods.

At present a number of methods of conservation have been recommended. The method in widest usage is that of storing bone at low temperatures (Abalmasonova et Ginsburg, 1956; Imamaliev, 1957 and others) and after lyophilization (Demichev, 1963).

In recent years, embedding of bone tissue in hard media, such as paraffin (Lisicyn, 1964; Nadein, 1969 and others) and polyester (Vygodskaya et al., 1963; Askerov, 1967 and others) deserve acknowledgement.

The method of conservation of bone tissue in polyester, as recommended by the collaborators of the Central Institute of Traumatology and Orthopaedics (Vygodskaya et al., 1963) is handy and easy to carry out and permits storage at room temperature as well as transport or dispatching by mail to any place.

The method of taking the tissue from the donor constitutes an important problem. Up to the present, the main method of preparation of tissues has been by abiding with asepsis. However, although preparation was aseptic (Krupko et Tkachenko, 1963; and other), the tissues were frequently contaminated (in 4 to 10 % of cases).

In order to facilitate the way tissues are obtained, a number of authors (Kuzmenko, 1968; Savelyev, 1971; Sautin, 1963; Timashkevich, 1970; Imamaliev et al., 1971) recommended to carry out preparation of tissues under non-aseptic conditions, followed by sterilization.

Three modes of sterilizing biological material have been described in the literature:

1) biological sterilization, using various antibiotics;
2) chemical sterilization, using chemical substances and
3) physical sterilization, using ionizing irradiation.

The authors of this communication used the method of ionizing irradiation which achieves sterilization of contaminated tissues while preserving their biological properties (Imamaliev et al., 1971 and others). The authors' method consists of the following: preparation of the tissue is carried out under non-aseptic conditions. The bone is embedded in polyester after having been wrapped in a polyester film. After polymerization has been completed, the object is irradiated with a dose of 4 Mrad with the apparatus EKU-50.

In order to investigate the biological properties of irradiated bone tissue, bacteriological, morphological, roentgenological and biophysical examinations were carried out.

The bacteriological examinations resulted in the following: artificial contamination with a mixture of microbes (500 millions per 1 ml. with an exposition of 1 hour), conservation of bone tissue in plastic material and sterilization with gamma rays at a dose of 4 Mrad. Bacteriological examinations was carried out 9, 15 days, 3 and 6 months afterwards and proved sterility of the material in call cases.

The morphological examinations of 50 specimens after storage up to six months showed that bone tissue, prepared under non-aseptic conditions, conserved in plastic material and irradiated with gamma rays at a dose of 4 Mrad looked the same as bone which had been prepared under aseptic conditions and not irradiated with gamma rays.

In addition, the present investigation was aimed at studying the regenerative processes taking place after transplantation of homologous bone which was sterilized and conserved in plastic material, but not subjected to gamma-irradiation.

The experiments were carried out in 60 rabbits divided into two groups:

1) transplantation of bone prepared under non-aseptic conditions, conserved in plastic material and treated with gamma rays;

2) transplantation of bone prepared under aseptic conditions and conserved in plastic material.

Method of operation: Under local anaesthesia, an incision, 2—3 cm. long, was made over the middle third of the radius, the soft tissues around the bone was mobilized by blunt dissection, a defect, 7—9 mm. long, was made in the radius by excision of bone, using an electric saw and bridged with an intramedullary graft of homologous bone, measuring 1.5—2 cm. The wound was closed in layers by a catgut suture, the operated limb did not require additional fixation, because loading was entirely taken over by the intact limb.

The postoperative course was usually uneventful; on the first day after operation, the limb was oedematous, but after a few days oedema subsided and soon the rabbit started to use the operated limb. Ten days after operation the wound had healed by first intention.

X-ray examination after 7, 30, 60, 90 and 360 days furnished evidence that the implanted graft of homologous bone underwent gradual absorption and was replaced by newly formed bone tissue. The processes of regeneration proceeded in the same way in both the experimental and first control group. The

roentgenological results showed that transformation of a sterilized graft of homologous bone was identical with that of a transplant prepared under aseptic conditions and not irradiated with gamma rays (Fig. 1).

In histological slides transformation of a sterilized bone graft may be followed up to complete replacement by newly formed bone tissue (Fig. 1).

Fig. 1

The results of the above experiments made it possible to use sterilization with gamma-irradiation of homotransplants under clinical conditions for various reconstructive operations on bone.

A total of 137 homotransplants, conserved in plastic material and sterilized with gamma rays, were employed in 56 operations. Bone tissue was used in the treatment of various disorders as registered in the table.

Out of the 56 operations carried out in patients, in one case suppuration developed, in two cases the graft was absorbed without being replaced by regenerating bone tissue and in three cases the graft fractured, which was connected with disturbed conditions during postoperative treatment. In 50 patients, the results of the operations were good.

An excerpt of a case history is given for example in the following:

Patient S., a boy aged ten, was admitted to the Central Institute of Traumatology and Orthopaedics with the diagnosis of osteoblastoclastoma of the humerus. He complaint of little pain in the lower third of the right arm. He considered himself ill since April 15, 1970, when he received a blow to the arm, after which he could no more lift the limb.

He called at the Botkin Hospital, where a pathological fracture was found on X-ray in the lower third of the right humerus. A plaster cast was applied including the thorax; otherwise he was treated in outpatients. On Nov. 26

he was admitted to hospital on the children's ward of the Central Institute of Traumatology and Orthopaedics for surgical treatment. The X-ray showed that the cortical bone at the level of the fracture was thinned out all round except on the medial side, but its integrity was nowhere interrupted. There was no periosteal reaction. The pathological part was separated from the parts of

Fig. 2

Fig. 3

normal structure by a bone plate which was thicker in the distal part. It was assumed that this was a case of acystic form of osteoblastoclastoma of the right humerus (Fig. 2).

The operation was carried out on Dec. 7, 1970 (surgeon Berezhnoi): After preparing the operation field, a skin incision was made on the lateral aspect of the right arm. Partly by sharp and partly by blunt dissection the soft tissues were pushed aside from the tumour. Using an ultrasound saw, two fragments, 2×7 cm., were excised from the lateral aspect of the humerus. A cavity was thus opened, which was filled with a yellowish fluid and masses of tumour which resembled granulation tissue. The tumourous material was scraped out with a Volkmann spoon, a regional resection of the humerus on its medial aspect was carried out using an ultrasound chisel. The defect thus created was bridged with a massive intramedullary graft of homologous bone conserved in plastic material and sterilized with gamma rays, supplemented by short and thin transplants introduced from the medullary cavity and laid on

extramedullarily in the region on the defect. The wound was closed in layers by a catgut suture. A thoraco-brachial plaster cast was applied. The postoperative period was uneventful. Twelve days after operation, the stitches were taken out through a window cut in the plaster. The patient was discharged from hospital for further outpatient treatment at his home town.

One year after operation, on Sept. 4, 1971, the X-ray showed increased transformation and consolidation of the transplant. The humerus appeared slightly thicker, its structure at the operation site was irregularly denser, yet the outlines were sharp and the alignement correct. Both absorption and transformation could be discerned (Fig. 3).

Transplantation of homologous bone in the treatment of various disorders has brought, on the whole, good results.

In slow union of fractures and pseudarthrosis, the authors employed the method of intra- and extramedullary fixation of the graft (according to Chaklin).

Table 1. Employment of Bone Tissue Sterilized with Gamma Rays and Embedded in Plastic Material for Various Disorders

Operation	Number of transplants	Number of operations
Slow union of fractures and pseudarthrosis	25	7
Bone tumours	60	25
Scoliosis	30	15
Arthrodesis	22	8
Altogether	137	55

In scoliosis, homologous bone is used for fixation by the method which has been generally accepted: two grafts laid along the spinous processes. For bridging defects various methods are used: filling with bone chips or a "faggot" according to Volkov et al.

For arthrodesis cortical bone grafts are used.

CONCLUSIONS

1) The method of conservation of bone tissue in plastic material with subsequent sterilization with gamma rays may be employed for clinical practice.

2) Bacteriological examination of bone tissue prepared under non-aseptic conditions, contaminated with microbes, conserved in plastic material and sterilized with gamma rays at a dose of 4 Mrad, has proved sterile in all cases.

3) X-ray examination furnished evidence of gradual absorption of sterilized homotransplants with replacement of the absorbed parts by newly formed bone tissue at the same time. Transformation of sterilized bone proceeds in the same way as does transformation of bone conserved in plastic material yet not subjected to gamma ray irradiation.

4) The clinical observations have not disclosed any side effects in the recipient to transplantation of homologous bone. Integration of the graft has proceeded without complications.

SUMMARY

On a large experimental material, the authors studied transplanted homologous cortical bone. Bacteriological examinations have shown that bone tissue prepared under non-aseptic conditions, conserved in plastic material and sterilized with gamma rays at a dose of 4 Mrad is sterile in 100 % of cases.

Based on X-ray examinations, it may be concluded that sterilized transplants are transformed in the same way as do grafts prepared under aseptic conditions, embedded in plastic material but not irradiated.

It has been established on a large clinical material that sterilized homologous bone grafts may be widely employed in reconstructive bone surgery.

RÉSUMÉ

Propriétés biologiques du tissu osseux conservé dans une matière artificielle et sterilisé par les gamma-rayons
(Etude clinique expérimentale)

Imamaliyev A. S., Gachimov R. R.

Les auteurs ont étudié le tissu osseux compact homologue transplanté sur un vaste matériel expérimental. L'examen bactériologique a montré que le tissu osseux — préparé par un mode non stérile, conservé dans une matière artificielle et stérilisé par l'irradiation de 4 Mrad — était stérile dans 100 % de cas.

Sur la base des résultats radiologiques, on peut tirer la conclusion que les greffes stérilisées se transforment d'une même manière que celles-ci de contrôle qui ont été préparées sous conditions stériles et versées dans la matière artificielle sans irradiation.

Sur un matériel considérable, on a constaté une vaste mise en valeur des greffes homoplastiques stériles dans beaucoup de diverses opérations dans la chirurgie plastique des os.

ZUSAMMENFASSUNG

Die biologischen Eigenschaften des im Kunststoff konservierten und durch Gamma-Strahlen sterilisierten Knochengewebes

Imamaliyev A. S., Gaschimov R. R.

Auf einem umfangreichen experimentellen Material untersuchten die Autoren die transplantierte homologe Knochenkompakta. Die bakteriologische Untersuchung hat ergeben, dass das Knochengewebe, das auf unsterile Weise bereitet, im Kunststoff konserviert und durch Bestrahlung mit 4 Mrad sterilisiert worden ist, in 100 % aller Fälle steril war.

Aus röntgenologischen Ergebnissen kann die Schlussfolgerung gezogen werden, dass die sterilisierten Transplantate auf gleiche Weise transformiert werden, wie die Kontrolltransplantate, die unter sterilen Bedingungen bereitet und in den Kunststoff ohne Bestrahlung eingebettet wurden.

Auf einem umfangreichen Material wurde festgestellt, dass die sterilen Homotransplantate in der osteoplastischen Chirurgie bei verschiedenen Operationen eine breite Anwendung finden können.

RESUMEN

Propiedades biológicas del tejido óseo conservado en material artificial y esterilizado con los rayos gama. (Estudio clínico-experimental)

Imamaliev A. S., Gashimov R. R.

Los autores estudiaron el tejido óseo compacto homólogo transplantado sobre un amplió material experimental. Los exámenes bacteriológicos mostraron que el tejido óseo, que fue preparado de manera no estéril, al ser conservado en material arteficial y esterilizado por los rayos gama en la dosis de 4 Mrad, era estéril en el 100 % de los casos. A la base de los resultados de la radiografía se puede concluir que los injertos esterilizados se transformen de manera igual a los de control que fueron preparados en condiciones estériles y puestos en material artificial sin ser tratados por los rayos.

Según el amplío material fue constatado que los homoinjertos estériles podían ser empleados ampliamente en varias operaciones de la anaplastia de los huesos.

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REVASCULARIZATION OF FREE SKIN GRAFT IN DEPENDENCE ON THE RECIPIENT BED

M. BROZMAN

The problems connected with revascularization of skin grafts have not yet been completely solved, although some essential facts are already known. The Council of Authors who studied the process of integration of grafts reached the conclusion that revascularization was effected by invasion of vessels from the bed into the transplant (Garré, Davis-Traut and Converse). Other authors believe that revascularization of transplants proceeds by both invasion of new vessels and, chiefly, by utilization of the original vascular system (Peer, Ham and Haller).

The aim of the present investigation was to confirm the process of revascularization of a free graft in rabbit. The main concern was attached to a comparison of the regenerative vascular processes, taking place in a skin graft laid on a recipient bed covered with granulation tissue, with those proceeding after removal of this tissue. The author based his study on the results of Demjén's papers who furnished evidence of a surer take of the transplant after the granulation tissue had been removed from the bed. The graft took with less scar tissue and without any marked contracture.

MATERIAL AND METHODS

A total of 45 silver-grey rabbits of both sexes, weighing 1.5 to 3 kg, were used for the experiments. Prior to the experiment, the skin on the lateral sides of the ears was depilated. Two days later, circular skin defects, measuring 15 mm. in diameter, were made under local anaesthesia with 0.5 % mesocain and under sterile conditions on the proximal parts of the ears. The defects were covered with tule gras and gauze. Both ears were immobilized with leukoplast. Seven days later the floor of the defects was covered with granulation tissue. In one defect the granulation tissue was left intact, while from another and from those of the other ear the granulation tissue was removed. Full-thickness free skin grafts were taken from the distal parts of the ears, the same size as the defects, and sutured to the edges of the defects with four

silon sutures which were also used for maintaining the grafts in place by tying them across over cotton wool pads soaked in flavine. The grafts were checked after 24, 48 and 72 hours. A mixture of Indian ink plus gelatine (Šmahel, 1962) was injected intracardially under general ether anaesthesia at the same intervals. After injection, the grafts changed their colour as compared to the surrounding skin. The total skin specimens were histologically examined in thick (50 to 150 μ) sections, stained with haematoxylin-eosin or according to van Gieson. The transplants were clarified with glycerine after their removal from the recipient bed and examined in the stereomicroscope.

OBSERVATIONS

After having been lifted off the donor site and with their subcutaneous tissue removed, the free skin grafts had a pale appearance and stayed like this for the following 24 hours. In both the grafts became oedematous within this interval.

After injection of the vascular system with the mixture of Indian ink plus gelatine, the grafts implanted into recipient beds covered with granulation tissue did not change their colour and their paleness and conspicuously contrasted with their dark-blue surroundings. Most of the grafts implanted into beds from which the granulation tissue had been removed also stayed pale. However, in some areas a bluish shadow could be observed.

The stereomicroscopic examination of the grafts separated from the recipient beds lined with granulation tissue revaled an empty vascular system and the vessels did not even show an indication of dilation. In the transplants taken from beds without granulation tissue, the vascular network presented a fine, yet incontinuous filling (Fig. 1).

In histological sections, the transplants layed on gratulation tissue showed close attachment to the beds. The vessels of the beds ran at right angles to the bases of grafts. The entire border areas showed inflammatory reaction (Fig. 2).

In the second group, i.e. in grafts implanted into beds after removal of granulation tissue, the vessels of the bed also ran at right angles to the surface. The ends of the vessels formed wide open orifices facing the graft. The surface of the bed was smooth. Inflammatory reaction on the border between bed and transplant was found only in foci and of small extent. Some of the vessel endings showed conic vascular processes (Figs. 3 and 4).

Forty-eight hours after implantation onto granulation tissue, the graft still remained pale and oedematous. In the other group, the oedema also persisted, but the pallor was no longer even; spots of reddening had appeared.

After injection of Indian ink plus gelatine, the pallor markedly contrasted with the dark-blue neighbourhood in the transplants of the first group. In the second group transplants, a dark-blue shadow appeared in some areas, but the contrast with the neighbourhood still persisted.

Stereomicroscopic examination of clarified specimens of the first group showed that the vessels had not been filled. In 5 out of 15, only partial filling

and slight dilation of vessels was found (Fig. 5). In the second group, incomplete filling of the vascular system with Indian ink plus gelatine was observed. These vessels were the original vessels of the transplant (Fig. 6).

In the histological sections, invasion of a vascular network on the bed-transplant border was observed in the first group. The entire area of the bed showed inflammatory reaction and in some areas the Indian-ink-gelatine mixture seemed to have infiltrated the transplant (Fig. 7). In the second group, vascular links between bed and graft were found on histological examination. The inflammatory reaction on the bed-transplant border was negligible. The surface of the bed was smooth and the graft lay close to it (Figs. 8 and 9).

When examinig the grafts after 72 hours, it was found, in the first group, that oedema of the graft persisted, yet pink and blueviolet spots alternated. In the second group, oedema had almost completely receded and the appearance of the transplants was more homogenous, a pale pink, almost indentical with that of the neighbourhood.

The clarified specimens of grafts, examined in the stereomicroscope and the histological picture of sections revealed, in the first group, that the vascular system of the bed had inked up with that of the transplant after 48 hours, but inadequately, because the original system in the transplant had only been utilized partly. On the border between bed and transplant a thick layer of a fibrin network could be seen (Fig. 10). The clarified specimens of skin grafts showed a rich network of vessels well filled with Indian ink and gelatine in the second group (Fig. 11). In the histological sections, a link-up of the vascular systems of bed and transplant, chiefly by way of anastomoses and utilization of most of the original system of the transplant, could be ascertained (Fig. 12).

CONCLUSION

Based on the above observations, it may be stated that healing of a skin defect covered with a free skin graft represents a whole chain of processes, linked up with one another, which do not always possess the same preconditions for integrating the graft with its recipient bed. In this respect, the bed always represents the predominant factor and the layed on graft only modifies the entire process by offering its own vascular system, which has an influence on the quantitative side of the healing process. The mode in which revascularization of transplants proceeds depends on the condition during transplantation, chiefly on the qualities of the recipient bed and the transplant, but the technique and tactics of transplantation itself affect it to no small extent.

If the original vascular system is utilized during the taking of a skin graft and the latter is integrated earlier, as was observed in the transplants applied to beds after removal of granulation tissue, a minimum scar base is formed for the graft. In the presence of granulation tissue in the bed, scar tissue keeps on developing, which enhances the thickness of the resulting scar. Removal of granulation tissue, provided the local and general conditions permitting,

creates more favourable conditions for the entire healing process, because most of the bacterial flora growing on the surface as well as inside granulation tissue is also removed, the recipient bed is activated and, chiefly, the floor is smooth, which provides a better chance for the vascular link-up between graft and bed not only on the wound floor, but also on the wound edges. The early development of anastomoses has a favourable influence on the other processes in the bed (transformation of the vascular system, inhibition of further growth of granulation tissue, etc.), effects shortening of the phase of plasmic nutrition, which accelerates vascularization and thus improves the functional and cosmetic results of skin coverage. At the same time more favourable conditions for reinnervation are created. B. K.

SUMMARY

The study deals with revascularization of an autologous free skin graft in dependence on the recipient bed. The course of revascularization of the free skin graft 24, 48 and 72 hours after implantation is described. The link-up of the vascular system of the graft in dependence on the condition of the bed and the time intervals are compared. The experiments were carried out on 45 rabbits. The vascular system was demonstrated by intracardial injection of Indian ink plus gelatine for every interval. The comparison was carried out in histological sections and in the stereomicroscope.

RÉSUMÉ

Révascularisation d'une greffe cutanée libre à l'égard de lit

Brozman M.

Le travail traite la révascularisation d'une greffe autoplastique cutanée à l'égard de son lit. II décrit le cours de la révascularisation d'une greffe autoplastique cutanée libre dans la succession de 24, 48 et 72 heures, en comparant le temps de l'adhésion du système vasculaire de la greffe autoplastique à l'égard de son lit et en poursuivant l'utilisation du système vasculaire originaire de la greffe autoplastique. Les expériences ont été faites sur les oreilles de 45 lapins. Le système vasculaire a été illustré dans de différents intervalles de temps par une piqûre intracardiaque de l'encre de Chine et de la gélatine. L'observation a été faite sur les sections histologiques à l'aide de stéreomicroscope. La révascularisation des greffes cutanées libres qui ont été ajoutées sur le lit après l'écartement du tissu granulaire s'effectuait pour la plupart par l'adjonction au système vasculaire originaire de la greffe autoplastique au cours de 48 heures. S'il s'agit des greffes cutanées libres étant ajoutées sur le lit avec le tissu granulaire, la révascularisation de la greffe est retardée.

ZUSAMMENFASSUNG

Die Revaskularisation eines losen Hauttransplantates in Abhängigkeit vom Bett

Brozman M.

Der Beitrag befasst sich mit der Revaskularisation des losen Hauttransplantates in Abhängigkeit vom Bett. Er beschreibt den Revaskularisationsverlauf des losen Hautautotransplantates in der Zeitfolge von 24, 48 und 72 Stunden. Er vergleicht die zeitliche

Verbindung des Gefässsystems des Autotransplantates in Abhängigkeit vom Bett und verfolgt die Ausnutzung des ursprünglichen Gefässsystems des Autotransplantates. Versuche wurden an Ohren von 45 Kaninchen durchgeführt. Das Gefässsystem wurde in einzelnen Zeitabständen durch intrakardiale Injektion von Tusche-Gelatine durchgeführt. Die Beobachtung erfolgte an biologischen Schnitten und stereomikroskopisch. Die Revaskularisation der losen, auf das Bett nach der Abtragung des Granulationsgewebes angelegten Hauttransplantate erfolgte hauptsächlich durch Verbindung mit dem ursprünglichen Gefässsystem des Autotransplantates bereits binnen 48 Stunden. Bei losen Hauttransplantaten, die auf ein Bett mit dem Granulationsgewebe angelegt wurden, ist die Revaskularisation des Transplantates verzögert.

RESUMEN

Revascularización de un injerto cutáneo libre en dependencia al lecho

Brozman M.

La obra se ocupa de la revascularización del injerto autoplástico cutáneo libre en respecto al lecho. Describe el transcurso de la revascularización de un injerto autoplástico cutáneo libre durante la succesión temporal de las 24, 48 y 72 horas. Compara el tiempo del enlace del sistema vascular del injerto autoplástico en respecto al lecho y estudia el modo en que se aprovecha el sistema vascular original del injerto autoplástico. Los experimentos fueron perfomados en las orejas de 45 conejos. El sistema vascular fue demostrado en los intervalos particulares con una inyección intracardial de la tinta china-gelatina. Las observaciones fueron hechas en secciones histológicas y bajo un estereomicroscopio. La revascularización de los injertos autoplásticos cutáneos libres aplicados al lecho después de la remoción del tejido granular transcurría principalmente por la unión al sistema vascular original del injerto autoplástico dentro de 48 horas. En los injertos autoplásticos cutáneos libres aplicados al lecho con el tejido granular la revascularización del injerto autoplástico es más retardada.

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REACTION OF HAEMOPOIETIC SYSTEM TO TRANSPLANTATION OF HOMOLOGOUS BONE TISSUE

V. Y. BRUSKINA

The reaction of the recipient's organism to transplantation of homologous bone tissue has been insufficiently investigated up to the present day. Among others, as shown by the research of Burwell et Gowland (1961 and 1962), Meyerson et al. (1966) and others, bone tissue possesses a definite degree of antigenic activity. Consequently, one may anticipate that, after transplantation of bone, an immunological reaction will develop, which can obviously become the cause of complications in some cases.

Complications after transplantation of homologous bone, particularly after transplantation of joint condyles, are met with in a large percentage of cases, about in 8 to 30—35 % (Krupko et al., 1967; Volkov et al., 1968; Zatsepin et al., 1970 and Makhson, 1970). They manifest themselves in suppuration, absorption and fragmentation, pathological fractures of the graft at a late date after transplantation, which are frequently not diagnosed correctly enough.

Together with specific immunological research aimed at anticipating the recipient's reaction to transplantation of homologous bone, special attention deserve the methods of investigating the non-specific reaction of the organism. In this respect, study of the recipient's haemopoietic system, a sensitive and fine indicator of all changes taking place in the organism as a response to various occurrencies, including transplantation of homologous bone, is very interesting.

The reaction of the haemopoietic system to transplantation of homologous bone as manifested under clinical conditions, has hitherto been insufficiently elucidated in the literature. There are yet few communications which only deal with the picture of the peripheral blood during the first two months after transplantation (Panova, 1959; Demichev, 1960; Kononenko, 1964 and Krumin, 1964). Both in the Soviet and foreign literature, the author of this communication has not found a detailed investigation of changes in the haemopoietic system, which take place during a long period, including investigation of the quality of blood cells and the bone marrow, as the main organ of haemopoiesis.

At present, the leading role of lymphocytes in the immunological reaction to transplantation of organs and tissues, has been established. Lymphocytes, as is well known, represent a considerable part of the formed blood elements of blood and bone marrow. At the same time, study of the lymphocyte reaction of the haemopoetic system to transplantation of homologous tissues in general and bone in particular has not received the attention it deserves.

The task of the present investigation was to study the condition of the haemopoietic system by a detailed qualitative analysis of the lymphocyte reaction and the cytological characteristic of the bone marrow in connection with the type of bone material transplanted, the age of the patient (whether adult or child) and the clinical result of homotransplantation.

MATERIAL AND METHODS

The following methods of investigation were employed: examination of the peripheral blood picture, incl. the main indicators of the haemogram; the lymphocyte reaction by the method of lymphocytogram (when counting the lymphocytogram, thin smears of blood, stained with the Pappenheim method, were used). Differentiated count of 100 lymphocytes, dividing them into large (larger than 14 μ), small (less than 7.5 μ) and medium (more than 7.5 μ yet less than 14 μ) was carried out; the bone marrow cells, obtained by sternal puncture, were examined in meylograms.

All investigations were carried out during certain periods starting with the preoperative period and afterwards during three to four years and in special cases even five years and more after operation. A total of 4570 examinations were carried out in 843 patients.

Peripheral blood pictures were studied in 843 patients, divided into two groups: 508 after transplantation of homologous bone and 335 patients of the control group. Among the uncomplicated cases after homotransplantation of bone, 85 adults and 15 children were implanted condyles and in 139 adults and 214 children it was a graft of cortical bone.

In the control group, 52 patients had been subjected to transplantation of autologous bone and 283 to a bone operation without bone transplantation. Among the patients operated on without employment of a bone graft, a special group (32 patients) who had received massive blood transfusions during extensive operations, was picked out.

Method of lymphocytography was employed in studying the lymphocyte reaction in 65 patients, 57 of whom after transplantation of homologous bone and 8 after operations without bone plasty. A total of 362 lymphocytograms were thus examined.

Cytological examination of the bone marrow was carried out in 68 patients, 62 of whom after homotransplantation of bone (in 57 joint condyles had been employed) and in six the operations were performed without employment of bone grafts. A total of 96 myelograms were thus investigated.

RESULTS

Examination of Peripheral Blood

The results of haematological examinations showed that a number of changes in the peripheral blood were identical in the patients of both the experimental and control group. These changes were the postoperative decrease in the indicators of the red blood, higher blood sedimentation rate an increase in the number of leucocytes, accompanied by neutrophilia and a shift to the left, eosino-, basophilo- and lymphopenia and monocytosis. It is obvious that all these haematological changes reflect the immediate reaction of the organism to the surgical trauma and the loss of blood.

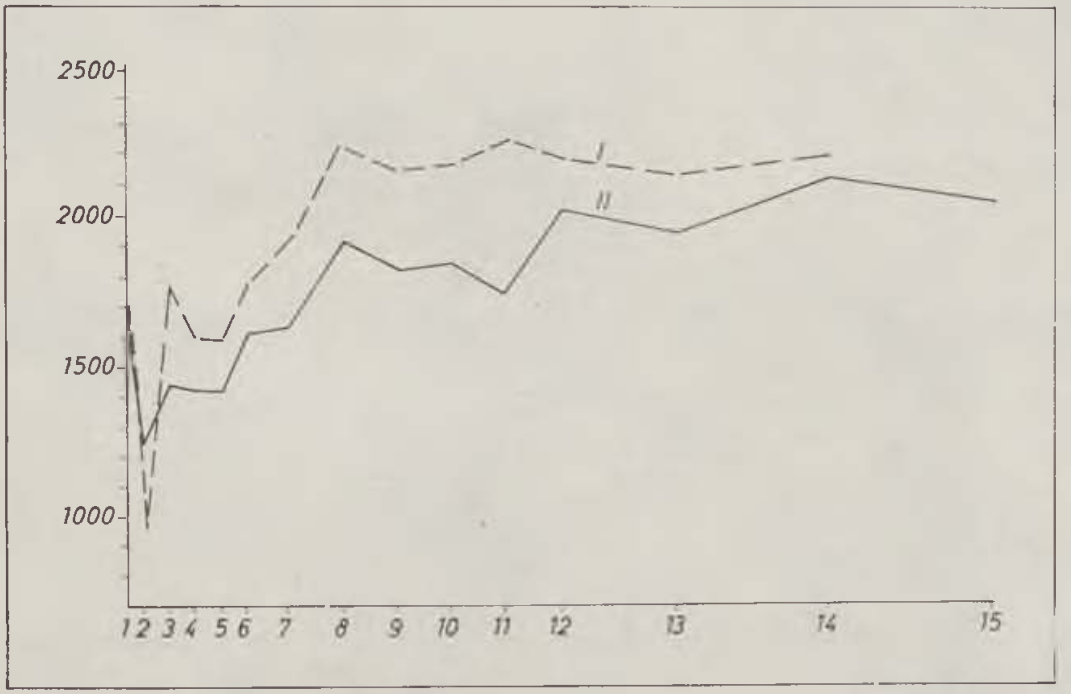

Fig. 1. Change in number of lymphocytes in peripheral blood. Fig. 1a) after implantation of homologous joint condyles: I — in children, II — in adults

Fig. 1a. (1) prior to operation, (2) one day, (3) seven days, (4) 14 days, (5) 21 days, (6) one month, (7) six weeks, (8) 8—10 weeks, (9) 3—4 months, (10) 5—6 months, (11) 7—10 months, (12) one years, (13) one-and-a-half to two years, (14) 3—4 years, (15) 5—6 years

A number of changes in the peripheral blood were only typical of the patients who had undergone a homoplasty of bone. This holds good for the eosinophilic and lymphocytic reaction of the peripheral blood. In patients of this group, particularly children, an increase in the number of eosinophilic leucocytes was observed from the seventh day after transplantation and persisted afterwards up to two or four months. The increase in the number of eosinophils was statistically significant in children ($P < 0.02$). In adults, eosinophilia was less marked. In the patients of the control group, eosinophilia was not observed.

The largest haematological changes in patients after homoplasty of bone was in the number of lymphocytes at a late period after operation.

Immediately after the homoplasty the relative and absolute number of lymphocytes dropped, which reflected the reaction to the surgical trauma and the stress connected with it. Two to three weeks after operation, the absolute number of lymphocytes reached the original level. Eight to ten weeks after operation a statistically significant increase in the number of lymphocytes was observed in the peripheral blood ($P < 0.001$). This increase in the absolute number persisted with slight oscillations for a long time — up to three or four years and even longer (Fig. 1 a and b).

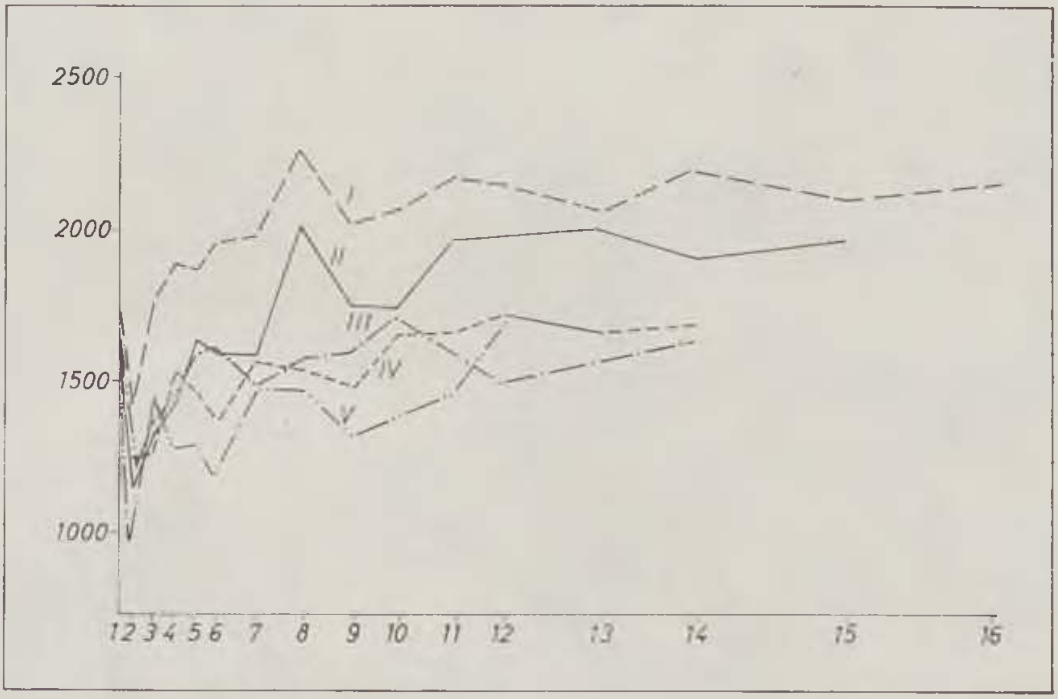

Fig. 1b. After implantation of cortical homotransplants and in patients of control group: I — implantation of cortical homotransplant in children, II — implantation of cortical homotransplant in adults, III — autotransplantation of bone. IV — operation without bone transplantation, V — operation with massive blood transfusions; on X — time after operation; on Y — number of lymphocytes in 1 mm^3 of blood

Fig. 1b. (1) prior to operation, (2) one day, (3) seven days, (4) 14 days, (5) 21 days, (6) one month, (7) six weeks, (8) 8—100 weeks, (9) 3—4 months, (10) 5—6 months, (11) 7—10 months, (12) one year, (13) one-and-a-half year, (14) two years, (15) 3—4 years, (16) 5—6 years

Any difference in the lymphocytic reaction to transplantation of either cancellous or cortical bone grafts was not observed.

In children the rise in lymphocyte count (2221.5 ± 243.5) was higher than in adults 1912.7 ± 89.1), which may partly be explained by the higher lymphocyte count in children normally and partly also by the higher reactibility of the lymphocytic system in children.

After autotransplantation of bone and operations without the emloyment of bone grafts, a rise in lymphocyte count was not observed during the respect-

ive period, including even the patients who been given massive blood transfusions during operation (Fig. 1b).

A special group was formed by the patients with homologous osteo-articular grafts under absorption (a total of 21). In most of them (17) the rise in lymphocyte count was higher at the peak of transplant absorption than in patients without complications after homotransplantation of bone.

In eleven out of 34 patients with suppuration in the region of the homotransplant apart from the neutrophilic reaction, typical of any suppuration,

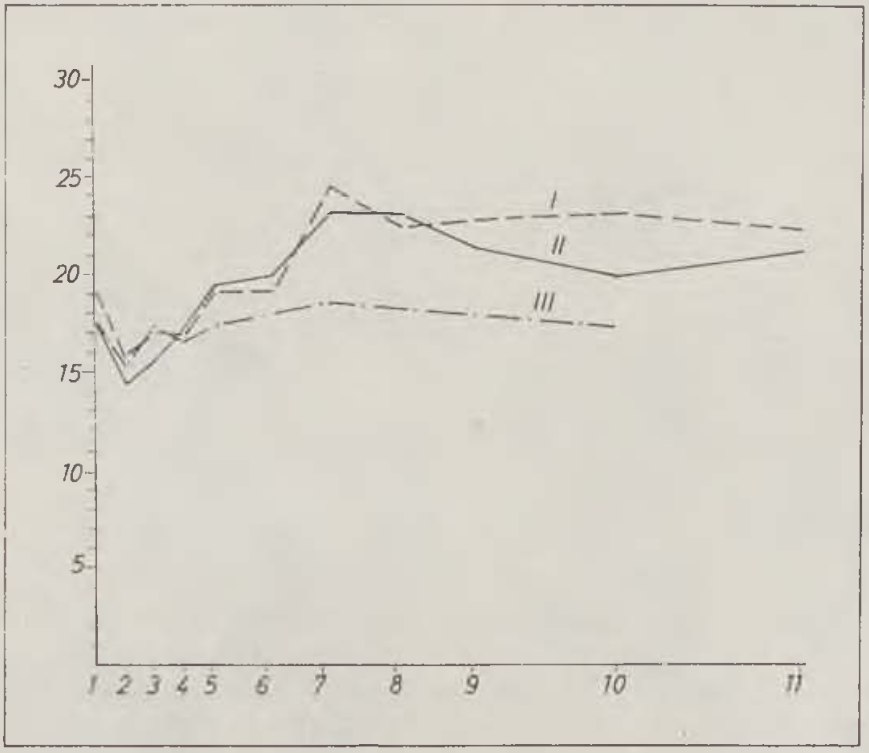

Fig. 2. Changes in number of small lymphocytes in lymphocytogram of children (I) and adults (II) after homotransplantation of bone and patients of control group (III). On X — days after operation; on Y — number of small lymphocytes per 100 lymphocytes
Fig. 2. (1) prior to operation, (2) seven days, (3) 14 days, (4) 21 days, (5) one month, (6) six weeks, (7) 8—10 weeks, (8) 3—4 months, (9) 5—6 month, (10) one to two years, (11) 3—5 years

a mixed neutrophil- lymphocytic reaction was observed at a late period after transplantation. This was characterized by a shift to the left (large numbers of rod neutrophils) together with a rise lymphocyte in leucocytes-count. It is suggested that this reaction is caused by the addition of the non-specific inflammatory reaction accompanying suppuration and the specific lymphocytic reaction to implantation of homologous bone.

In both an uncomplicated and complicated postoperative course after transplantation of homologous bone, a lymphocytic reaction was found in the peripheral blood, which was more intensive, if the bone graft was in the process of being absorbed. These results confronted with those in the control group per-

mit to assume that this lymphocytic reaction has a specific link to transplantation of homologous bone tissue and is in no connection with either the surgical trauma or blood transfusion, because it was absent in patients of the control group.

Lymphocytic Reaction in Lymphocytogram

From the point of view of their morphology and function, lymphocytes represent a rather heterogeneous group (Arneth, 1920; Nikolayev, 1935 and Grigorova, 1957 and 1963). Tris is why it seemed expedient to investigate the

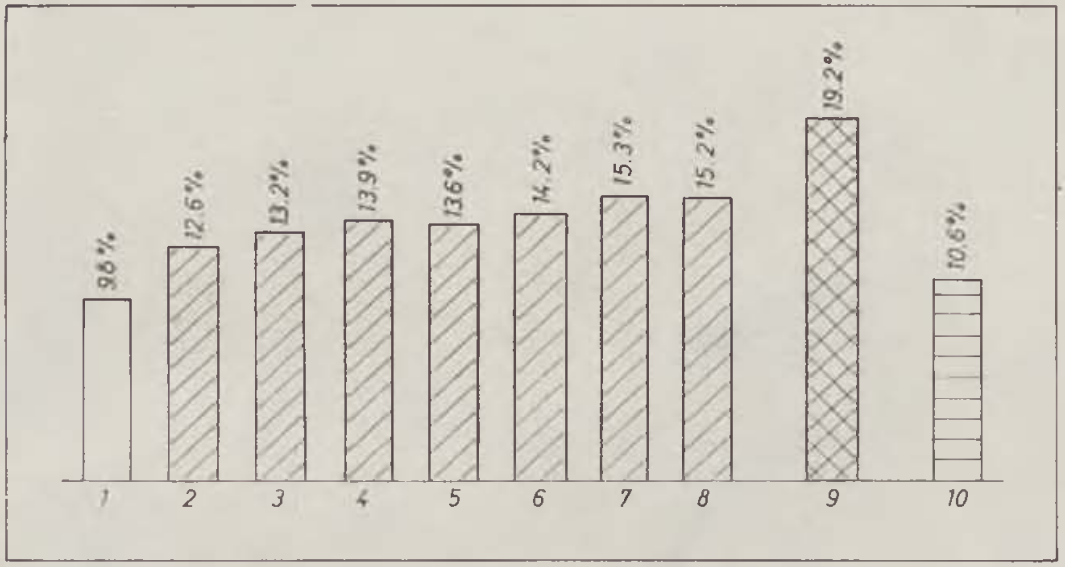

Fig. 3. Change in number of lymphocytes of bone marrow in patients after homotransplantation of bone and of control group

Fig. 3. (1) prior to operation, (2) one month after transplantation, (3) 2—3 months, (4) 4—6 months, (5) 7—10 months, (6) one year, (7) 2—3 years, (8) 4—5 years, (9) absorption of homotransplant, (10) control group

lymphocytic reaction in a lymphocytogram. This method is based on dividing the lymphocytes according to size (large, medium and small ones) and the relation between nucleus and cytoplasm (with a large or small proportion of cytoplasm).

The morphology of lymphocytes is closely related to their function. According to reports in the literature, the ratio of lymphocytes within the lymphocytogram changes under various pathological conditions. The author of this investigation has not found any communication in the literature dealing with the lymphocytogram after homotransplantation of tissues in general and bone in particular.

According to the author's findings, a statistically significant ($P < 0.02$) rise in small lymphocyte count in the lymphocytogram is specific of transplantation of homologous bone, even in the absence of complications. This change has never been observed in the subjects of the control group. This rise was also found at the peak of the increase in number of lymphocytes in general (8—10 weeks after operation) and persisted afterwards up to 3—4 years (Fig. 2).

In six patients with homotransplants under absorption the rise in the number of lymphocytes was due to a rise in the number of small lymphocytes (up to 30—35 % from the original 17.8 ± 0.8 in adults and 19.3 ± 0.7 in children, $P < 0.01$).

In suppuration which had developed around the transplant (six patients), a simultaneous increase in the number of both large and small lymphocytes was observed in some lymphocytograms (corresponding to a decrease in the number of medium-size lymphocytes) which is also connected with the presence of two components, i. e. inflammatory reaction for which the increase in the number of large lymphocytes is typical, according to Nikolayev (1935), Itelson (1952) and Grigorova (1957) and sensitization of the recipient organism to implantation of homologous bone, which is reflected by the increase in number of small lymphocytes.

Thus, when studying the lymphocytic reaction in the lymphocytogram, the leading role of small lymphocytes after implantation of homologous bone tissue, particularly in grafts under absorption, was disclosed.

Investigation of the Reaction of the Bone Marrow

The author did not find any communication in the literature dealing with the reaction of the bone marrow to homotransplantation of bone tissue.

Granulocyto- and erythroblasts of the bone marrow, plasma cells, reticular cells, haemocytoblasts did not show any changes in connection with homotransplantation of bone.

The main changes in the myelogram were in the number of lymphocytes. From the first month after homotransplantation of bone tissue, a gradual increase in number of lymphocytes was observed, which was statistically significant ($P < 0.001$) and persisted for 4—5 years (Fig. 3).

The increase in number of lymphocytes was larger in cases where the grafts were in the process of absorption (16 patients). This number was significantly increased at any time after operation, even the homologous bone graft did not show any sign of absorption, and was twice the number of the original (from 9.8 ± 0.6 prior to operation to 19.2 ± 0.74 in case of the bone graft being absorbed).

In patients of the control group, no rise in the number of lymphocytes was observed in the myelogram.

DISCUSSION

The investigations referred to above have shown that the haemopoietic system reacts in a specific way to transplantation of homologous bone tissue. In the peripheral blood this reaction is characterized by an increase in number of eosinophils early after operation, which persists for 2—4 months in patients of various groups. This can obviously be connected with the allergic reaction to the introduction of foreign bone tissue. The larger increase in number of

eosinophils in children is probably due to them being more inclined to allergic reactions and also, perhaps, to a preceding allergization of the child's organism by numerous prophylactic vaccinations.

The change in number of lymphocytes as observed at a late period, starting 8—10 weeks after transplantation, seems most interesting.

Because lymphocytes, according to modern conception, are the main carriers of immunizing competence, it may be assumed that immunizing mechanisms lie at the base of the lymphocytic reaction in the peripheral blood. These mechanisms are connected with the sensitization of the organism to a graft of homologous bone.

As far as the late development and the persistence of the lymphocytic reaction are concerned, it may, perhaps, be explained by the specific structure of the homotransplant of bone and the changes under the particular conditions created by the reparative processes taking place inside bone, where the metabolic processes are retarded (Lavrishcheva, 1969). This obviously also explaine why a number of authors who have studied the changes in the peripheral blood, which take place in the first two months after homotransplantation of bone, did not find any deviation in the number of lymphocytes.

The results of quantitative examination of the changes in lymphocytes were supplemented by the differential count of the lymphocytogram. The leading role of small lymphocytes was established after homotransplantation of bone. A similar increase in number of small lymphocytes in the lymphocytogram was observed by a number of authors during the phase of allergy in infectio-allergic disorders and after vaccination with BCG (Grigorova, 1963; Pedanova, 1963 and Itelson, 1952).

There is no uniform opinion in the literature on lymphocytes originating in the bone marrow. The hypothesis of Joffey, according to which lymphocytes developing in the various parts of lymphatic tissue, reach the bone marrow via the blood stream.

Other haematologists (Vlados, 1953; Rohr, 1960; Keiser, 1966; Keiser et al., 1964; Osmond, 1969 and others) believe that the bone marrow also participates in the production of lymphocytes. It may be assumed that the increase in number of lymphocytes in the bone marrow, taking place after homotransplantation of bone, has a twofold origin: by flooding the marrow with lymphocytes via the blood stream (as a result of hyperproduction of lymphocytes in the lymphatic system) and by an increased production of lymphocytes in the bone marrow itself, and the nodes of lymphoid tissue inside the bone marrow (Rohr, 1960).

The lymphocytic reaction of the haemopoietic system was much more intensive when the homologous bone graft was in the process of absorption. In the peripheral blood of two-thirds of the patients under observation, the number of lymphocytes was higher than after uncomplicated homotransplantation. In the lymphocytogram, the number of lymphocytes of small size was higher, in the myelogram the number of lymphocytes was twice as high as

normal. The reaction of the bone marrow to absorption of the homotransplant was most intensive. Special interest should be paid to the fact that in single cases (3 patients) the haemato-morphological changes indicated imminent absorption of the homotransplant and preceded the appearance of clinical signs of absorption by several months.

CONCLUSIONS

1) A very intensive reaction of the homopoietic system develops as a response to implantation of homologous bone.

2) Eight to ten weeks after homotransplantation of bone tissue an increase in the number of lymphocytes with an increase in the number of small lymphocytes in the lymphocytogram may be found in the patients. Afterwards these changes persist for a long time, up to several years.

3) A reaction of the bone marrow, characterized by an increase in the number lymphocytes in the myelogram at a late period after operation, develops after transplantation of homologous bone.

4) When the homotransplant undergoes absorption, the lymphocytic reaction of the blood system is much more intensive than in the case, where homotransplantation of bone proceeds without complication.

5) After transplantation of autologous bone as well as after operations on bone without transplantation, including massive blood transfusions, a lymphocytic reaction of the haemopoietic system has not been observed.

SUMMARY

The dynamics of the peripheral blood picture was investigated in 843 patients, the lymphocytogram in 65 and the myelogram in 68 patients after transplantation of homologous bone and in patients of a control group who had had an autotransplantation or who had been operated on their bones without bone transplantation. It was found that the haemopoietic system very intensively reacts to homotransplantation of bone tissue. This reaction consists in an increase in the number of lymphocytes in the peripheral blood from eight to ten weeks after transplantation together with an increase in the number of small lymphocytes in the lymphocytogram as well as an increase in the number of lymphocytes in the myelogram. These changes persist afterwards for several years. The lymphocytic response is much more intensive in cases where the homotransplantant undergoes absorption, than in cases which proceed without complications. After transplantation of autologous bone or operation on bone where no transplant was empolyed, no lymphocytic reaction has been observed. It may be assumed that this lymphocytic reaction of the haemopoietic system is based on immunizing mechanisms connected with the sensitization of the recipient organism to the implantation of homologous bone tissue.

RÉSUMÉ

Réaction des organes d'hématose à l'homoplastie du tissu osseux

Bruskina V. J.

On a étudié la dynamique du tableau sanguin dans le tableau du sang périphérique de 843 malades, dans le lymphocytogramme de 65 malades, dans le myélogramme de 68 malades après une homoplastie de l'os et chez les malades de contrôle après une autogreffe de l'os et après des opérations des os sans transplantation de l'os. On a constaté que les organes d'hématose réagissent très remarquablement à une homoplastie du tissu osseux. Cette réaction s'est traduite par un nombre élevé de lymphocytes dans le sang périphériques et à partir de 8 à 10 semaines après la transplantation par un déplacement vers les petits lymphocytes et même par un nombre élevé de lymphocytes dans le myélogramme. Ces modifications résistaitent pendant quelques années. Tous les indices de la réaction lymphocytaire étaient plus distincts dans la destruction de la greffe que dans la guérison sans complications après une homoplastie osseuse. Dans l'autogreffe d'un os et dans les opérations osseuses sans transplantation osseuse, la réaction lymphocytaire n'a pas été remarquée. On suppose que la réaction lymphocytaire consiste en méchanismes réfractaires ce qui est en relation étroite avec la sensibilisation de l'organisme de celui qui reçoit la greffe osseuse.

ZUSAMMENFASSUNG

Die Reaktion des blutbildenden Systems auf die Homotransplantation des Knochengewebes

Bruskina V. J.

Die Dynamik des Blutbildes wurde untersucht im peripheren Blutbild von 843 Kranken, im Lymphocytogramm von 65 Kranken und im Myelogramm von 68 Kranken, die sich einer Knochenhomotransplantation unterzogen haben und auch bei Kontrollkranken nach Knochenautotransplantation und nach Knochenoperationen ohne Knochentransplantation. Es wurde festgestellt, dass das blutbildende System auf die Homotransplantation des Knochengewebes sehr markant reagiert. Diese Reaktion zeigte sich in der erhöhten Lymphozytenzahl im peripheren Blut, in der Verschiebung in Richtung der kleinen Lymphozyten, beginnend 8—10 Wochen nach der Transplantation, aber auch in der erhöhten Lymphozytenzahl im Myelogram. Diese Veränderungen blieben dann einige Jahre erhalten. Alle Anzeiger der lymphozytären Reaktion waren bei der Zerstörung des Transplantates deutlicher, als bei unkompliziertem Heilungsprozess nach der Knochenhomotransplantation. Bei Knochenautotransplantation und bei Knochenoperationen ohne Knochentransplantation ist die lymphozytäre Reaktion nicht beobachtet worden. Mann nimmt an, dass die lymphozytäre Reaktion auf immunitären Mechanismen in Zusammenhang mit der Sensibilisierung des Organismus des Empfängers durch das Knochenhomotransplantat beruht.

RESUMEN

Reacción del sistema hemopoiético a la homoplastia del tejido óseo

Bruskina V. J.

La dinámica del cuadro sanguíneo fue estudiada en el cuadro de la sangre periférica en 843 enfermos y en el linfocytograma de 63 enfermos y en el mielograma de 68 enfermos que habían pasado una homoplastia del hueso y en los enfermos de control

después de una autoplastia del hueso y después de unas operaciones en los huesos sin transplantación alguna del hueso. Fue constatado que el sistema homopoiético reaccionaba muy fuertemente a la homoplastia del tejido óseo. Esta reacción se manifestó por una cantidad elevada de los linfocitos en la sangre periférica a partir de 8—10 semanas después de la transplantación por translación hacia los linfocitos pequeños, mas también por un número elevado de los linfocitos en el mielograma. Estos cambios se mantenían después durante algunos años. Todos los índices de la reacción linfocitaria fueron más distintos en la descomposición del injerto que en la curación no complicada después de una homoplastia ósea. No fue observada ninguna reacción linfocitaria en la autoplastia del hueso, tampoco en las operaciones óseas sin alguna transplantación ósea. Se supone que la reacción linfocitaria se base en los mecanismos de inmunidad en relación con la sensibilidad del organismo del recipiente al homoinjerto óseo.

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OBLIQUE CLEFTS OF THE FACE

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We consider oblique facial clefts to be rare congenital defects. They are refered to in literature as "lateral clefts", further classified as transverse and oblique clefts (meloschisis). Davis (1935) found 5 oblique clefts in a group of 946 cleft facial defects. Blackfield (1950) reports a ratio of 5 lateral clefts to 500 cleft lips and palates. The incidence reported by both authors is extraordinary high. We selected in our group of 2.880 cases of facial cleft defects, 5 patients with oblique clefts. According to some authors, oblique clefts represent 0,25 % of all facial clefts.

Morian differentiates three forms of these clefts:

— in the first form the cleft proceeds laterally from the filter comprising the nasal cavity and the nasal wing;
— in the second form the cleft proceeds laterally from the nose and continues from the nasal part of the lower lid, possibly reaching further obliquely into the region of the forehead;
— in the third, the cleft starts in the corner of the mouth and proceeds arch-like over the face to the eye.

There is no precise differentiation between the second and third form.

The Nomenclature Committee of the American Association for Cleft Palate Rehabilitation, distinguished in 1962 two basic forms of the oblique cleft:

1) the naso-ocular cleft,
2) the oro-ocular cleft.

This basic differentiation has been established according to the changes of the apertura piriformis, which remains undamaged in the oroocular form. Both forms may be unilateral or bilateral. In the nasoocular form the cleft proceeds from the apertura piriformis to the medial canthus in the course of the nasolacrimal duct. At heavy complete forms of cleft, cleft of lip and palate is also usually present.

At the oroocular form it proceeds from the oral aperture in direction towards the medial or lateral canthus. There exists, according to the relation towards foramen intraorbitale, a subdivision into the medial and lateral type. With both forms of clefts (nasoocular and oroocular) there exist transient forms in the shape of scary stripes with the typical course described above.

Both forms of cleft (the oroocular form more frequently, however), may reach cranially as far as the forehand or into the temporal region. If the cornea is also affected, the cleft starts between the canine and the first childs molar tooth [even a course between the 1. and 2. has been reported (Gunter)] and proceeds laterally from foramen infraorbitale. This form is rather rare and its course does not correspond to the embryonic clefts. Karfík calls it the real oblique cleft (3).

Fig. 1. Bilateral oblique nasoocular cleft with agenesis of the frontal and parietal bones, hypertelorism and microphthalmia

Lighter forms of oroocular cleft may be connected with incomplete cleft of the lip which in contrast to the normal cleft of the lip is located laterally from Cupid's bow, avoiding the nasal wing. The base of this wing is placed laterally and drawn upwards. The bilateral incidence is the most frequent. There is no uniform opinion so far (4, 5) on which side the incidence of unilateral oblique clefts is more frequent. In about 75 % (P. F. Andersen) it is combined with other defects.

The most frequent accompanying defects are those of the CNS (encephalocele, hydrocephalus, agnesis of some skull bones, clefts of the lids, microphthalmia, pterygium of the conjunctiva, malformation of the nose, amniotic stripes, malformation of the fingers of both extremities, intrauterine amputation of the fingers and the extremities, pes equinovarus). Krause reports coloboma of the iris. The tear ducts may, but need not, be affected by the malformation.

According to Khoo-Boo-Chai, the oroocular cleft is about twice as often as the nasoocular cleft. Sometimes it is rather difficult to classify, because there exist mixed forms: the nasoocular type may be for ex. combined with the oroocular type. Or, the oblique cleft may appear together with the transverse cleft.

Fig. 2. Detail from the previous figure demonstrating bilateral complete cleft of the lip and alveolar processus

Fig. 3. Syndactylia of the ends of the 2.—5. finger of the same patient

ETIOLOGY

Burian considers oblique clefts to be the result of the effect of amniotic stripes upon borders of the contact of the paraaxial and visceral mesenchyma; these regions are marked by little resistance. Karfík suggested that the oblique clefts should be divided into paraaxial and atypical clefts. The paraaxial clefts correspond to the nasoocular clefts and Karfík considers them to be disorders of the rhinencephalus. He considers the atypical clefts — under which he clas-

sifies the oblique clefts (oroocular type) — to be the consequence of embryopathy.

Winckel (cited by Blackfield) is also inclined towards the hypothesis of amniotic stripes.

Other explanations, such as bad implantation of the ovum, diabetes, deficiency of vitamins A, D, E, rubeola, x-ray irradiation of the pelvic region in pregnant women, are involved in the etiopathogenesis of all facial developmental anomalies.

Fig. 4. Right side oblique oroocular cleft with cleft and defect of the lower lid

P. F. Andersen believes heredity as an etiopathogenetic factor to be an exception in rare clefts and therefore also in oblique clefts (6). For this reason there is no familial incidence of oblique clefts.

The death rate amongst patients with rare clefts is much higher than with normal clefts. This may be caused by the combination with other, often rather heavy, congenital defects (1).

THERAPY

The incidence being exceptional, practically every case is considered individually and requires therefore individual treatment. The heavier malformations must be treated in stages with consideration towards the affected organs and the further facial development. A suitable time of operation is selected accordingly.

The therapy of slighter clefts which do not seriously disturb the function of the affected organs is not urgent and postponement of the operation till a later period affords the growths spurt an undisturbed period and the growth potency during early childhood has a chance to develop.

The increased dimensions of the affected structures in later age, make a more accurate and more perfect repair possible.

Fig. 5. The cleft reaches in the lip the transient fold of the vestibulum oris and penetrates through the alveolar height to the palate

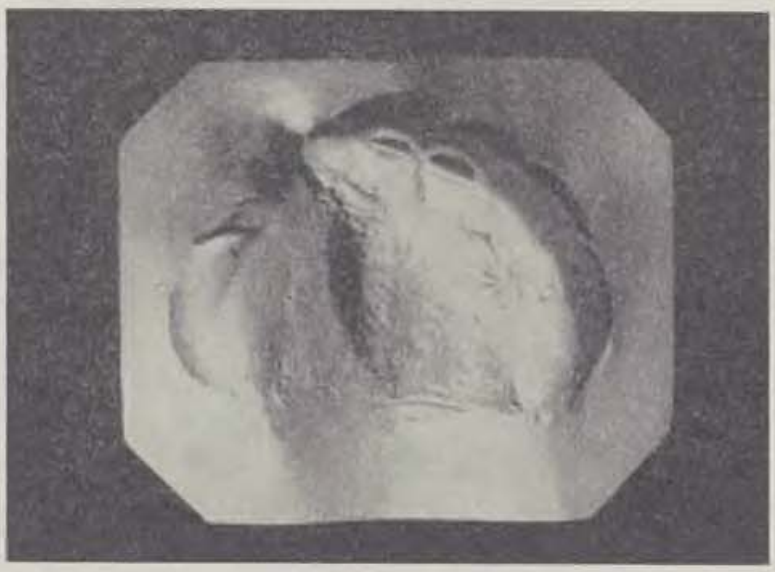

Fig. 6. A wall in dorsal direction and a flattening protrudes on the palate

At greater damage, early correction improves the function and achieves a more normal shape of the bone structures already by the fact that the soft part is being adapted. Surgery should be confined to the soft part so as not to disturb the growth potency by rough interference with the skeleton (7).

Clefts of the soft tissues, unless they are directly defective, have their

structures substituted by scary stripes. These have to be excised down to the healthy part. Only thus is it possible to fulfill the principle of connecting tissues which belong to each other. Thus we even avoid possible depression in the field of operation. Zig-zag sutures prevent shortening of the linear scars and cranial displacement of the vermilion border.

Heavy clefts connected with wide coloboma of the lid require urgently repair of the coloboma in order to prevent ulcer of the cornea. We leave the

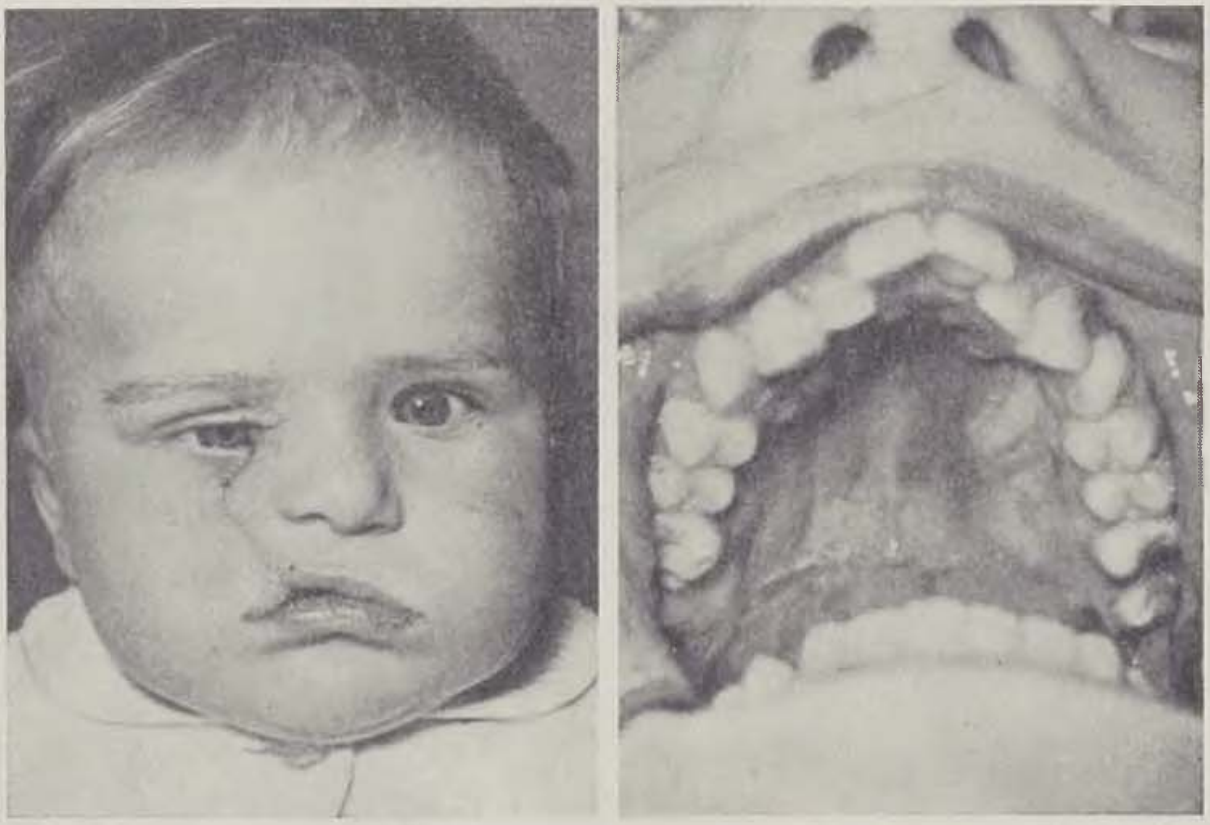

Fig. 7. The same patient immediately after the sutures healed — Fig. 8. The dent at ODF syndrome proceeds through the alveolus similarly as in our patient on Fig. 6

reconstruction of the nasolacrimal duct till later age when the dimensions of the structure are already larger.

Last not least, there are also the social indications to be considered: Heavy deformation of the child's face causes the parents to request repairs already in the first weeks after birth. In such cases we decide to place the afflicted child in an Institute for Infants, till the first operation. Thus we gain the time necessary for undisturbed growth of the young face and it saves the parents psychic traumatisation.

CASE REPORTS

K. B., born 29. 5. 1970, mother aged 23 years, father 23 years, both healthy, no congenital developmental defects (further only CDD) in the family.

Gravidity incidental, unwanted. Mother took some drugs for interruption of pregnancy in the early stage of pregnancy and disputed this fact later.

The request for interruption was not complied with. The child was given birth to, spontaneously prior to the appointed time, weight at birth 2900 g, length 48 cm. An infant with numerous clefts in the facial region and with syndactilia of the final phalanges 2.—5. of the fingers of both hands (Fig. 1, 2, 3). The child was placed into an infants institute and was brought to us for consultative examination.

The child is dystrophic, head irregular with numerous bony defects and defects of the soft tissues. Eyeballs in extreme hypertelorism with microphtalmia.

Fig. 9. A bony wall proceeds dorsally on the palate and disappears at the rear edge of the palatal processes — Fig. 10. Configuration of the nose in bilateral oblique cleft. Narrow nostrils, hypoplastic cartilages of the tip, especially lateral crura

The bilateral cleft proceeds laterally from the wide prolabium, penetrates the alveola in its entire height and continues cranially via the nasal pyramide, medially from the internal canthuses in direction to the forehead and from there obliquely into the parietal region. The defects in the nasal wall open up a view of the nasal septum and ethmoids. On the right side the cleft proceeds via orbital cavity, affects the upper lid and penetrates into the temporal region. Mighty protrusion of the forehead appearing like two tumorous formations of irregular surface. Frontal bone is missing. Protrusion of the prolabium, with lateral segments of the upper jaw behind it and in contact with it. The gothic palate is without cleft.

The child was fed by feeding bottle and did not gain weight well.

Cons. examination:

Ery 2,560.000, Hb 58 %, Leu 10.200, differential blood count: Ty 2 %, Se 52 %, Ly 36 %, Mono 10 %. Negative finding in urine and faeces.

The child died in its fourth month of purulent pneumonia.

Post mortem finding: agenesis of the frontal and parietal bones, meloschisis bilat., cleft of the lip and maxilla bilateral nasal hypoplasia, hypertelorism, microphthalmia. Syndactilias of the 2.—5. finger on both hands. Hydrocephalus

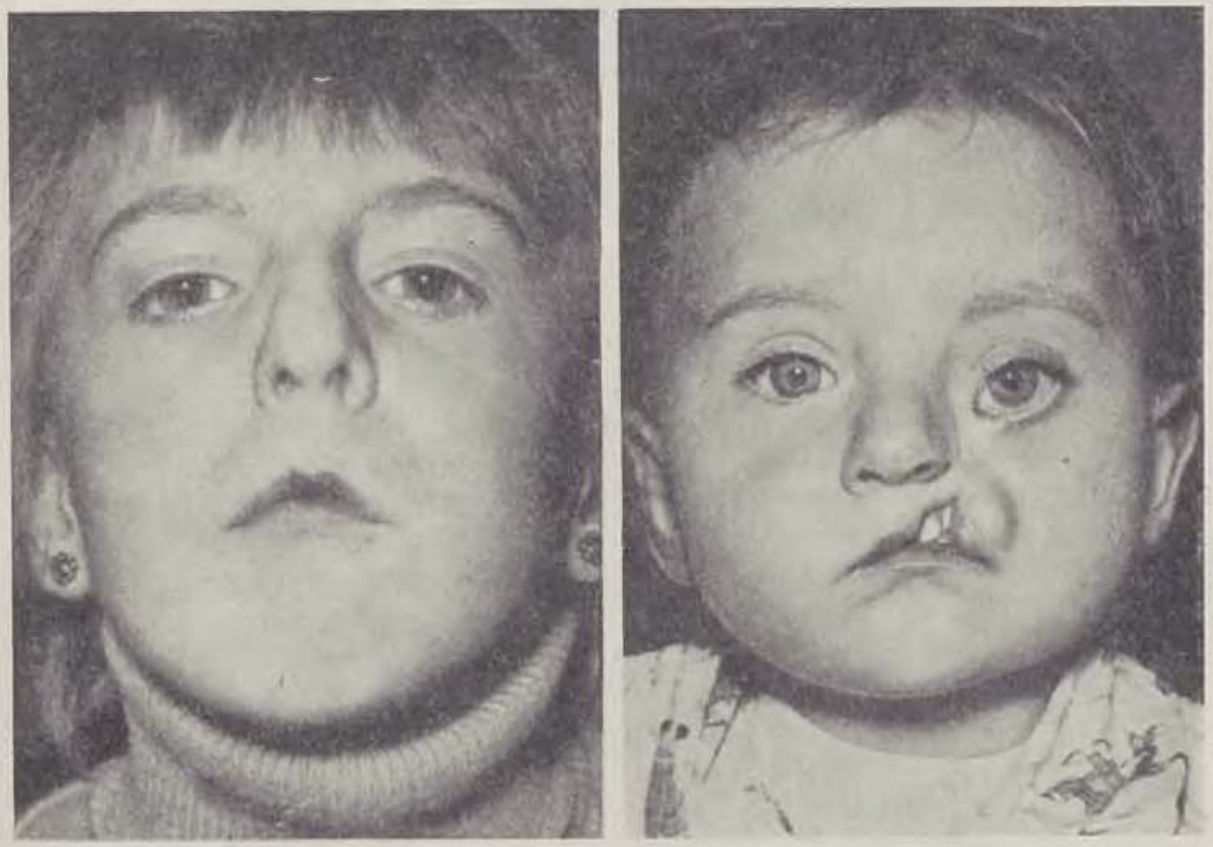

Fig. 11. Configuration of the nose at syndrome ODF. Narrow nostrils with hypoplastic lateral crura of the lip cartilages — Fig. 12. Left-side oblique oroocular (medial) cleft

externus and internus. Foramen ovale apertum, retentio testis inquinalis. Heavy brain oedema, venostasis hepatis et lienis acuta.

K. S., born 21. 2. 1968, case history Nr 37 327, mother aged 18 years, father 22 years, both healthy. Pregnancy and parturition without events.

The child eutrophic, lively, no developmental defect except facial cleft.

Local finding: the cleft line proceeds on the right side through the lip more laterally than we are accustomed to see in normal clefts. It continues cranially, avoids the right nasal wing and rises up into the lower lid. The lid is cleft and the conjunctiva is everted. The canthus of the right eye is dislocated in caudal direction by about 1 cm in comparison with the healthy side (Fig. 4, 5). The lacrimal duct ist not closed and as far as lacrimal pathways exist, they are constricted. There is a deep dent in the alveolar process which penetrates in its entire height in direction towards the palate. The dent is approximately in the

place of the future III, IV +. The palate is without defect. Approximately in half the width of the palate, a bony wall protrudes from the dent on the palate in dorsal direction. The wall continues and disappears slowly towards the termination of the palate plate (Fig. 6). The operation was carried out at the age of 7 months. It consisted of suture of the lip after excision of the cleft rims,

Fig. 13. The cleft proceeds over the lip to ¾ of the height and through the entire alveola

Fig. 14. The left nasal wing is displaced more cranially, there is a defect in the lower lid. The canthus is much lower than on the right side

exstirpation of the remnants of the lacrimal ducts and of substitution of the lid defect by an island flap from the upper lid. The healing under antibiotics (chloramphenicol) was without complications (Fig. 7).

We observed similar morphologic changes on the upper jaw in two of our patients with ODF (oro-digito-facial) syndrome. A wide segment of the jaw was

separated by a cleft which proceeded bilaterally between III. and IV. through the alveolus of the upper jaw; it protruded from the facial profile and contained numerous atypical teeth of canine shape (Fig. 8). The dents on the palate reached to about ½ of the palate process and from there, bony walls proceeded in dorsal direction parallel with the edge of the palate processes (Fig. 9). The palate itself was not affected by cleft. The nasal configuration is also similar as with Sy-ODF, especially at bilateral oblique cleft (Fig. 10). The nostrils are narrow (as the consequence of hypoplasia of the lateral crura of the tip cartilages) (Fig. 11).

Fig. 15. Condition immediately after the operation. The internal canthus and also the left wing repositioned to the same level as on the healthy side

K. A., born 9. 6. 1971, case history Nr 42 986, mother aged 23 years, father 27 years, both healthy. No records of congenital developmental defect in the family case history. Pregnancy and parturition without events. The child was born 14 days earlier, weight at birth 2500 g, length 46 cm. Bilateral hypoplasia coxae, conglutination of the nymphae, left side facial cleft of oroocular type (medial):

The cleft starts in the lip as normal cleft lip. It proceeds laterally from the left nasal wing in direction towards the left internal canthus. The cleft terminates under the nasal wing and proceeds as a groove covered with atrophic skin, without subcutaneous fat layer and without muscle layer. The left nasal wing is located medially and more cranially than on the right side (Fig. 12, 13).

A putrescent secretion flows from punctum lacrimale, if pressure is exerted laterally from the nose. Sounding of the lacrimal ducts on the left proved them to be constricted. The internal canthus was located about 10 mm lower than on the healthy side. Coloboma with a defect of about ¼ of the lid, in the lower lid (Fig. 14). Also small coloboma in the upper lid. Slight dent in the processus alveolaris on the left side, about in the place of +II. The palate is intact.

The operation was carried out when the child was one year old (after previous irrigation of the lacrimal ducts) and consisted of suture of the cleft lip, excision of the atrophic scary skin in the course of the cleft up to the lid. The rudiment of the lacrimal sac and ducts was extirpated. Front wall of the left maxilla defective. The mucosa of the antrum shines through in the place of the extirpated atrophic tissues. The coloboma in the lower lid is closed by shifting a skin flap from the upper lid. Ligamentum palpebrale mediale was repositioned to be level with the right side. Suture of the face carried out in levels. The healing under antibiotics was uneventful (Fig. 15).

SUMMARY

After the reports of Prof. Karfík had been published, we had opportunity to treat further three patients with oblique facial clefts.

In view of the fact that there is a low incidence of congenital developmental defects in the world, we suggest that a report should be made about each thus afflicted child. Thus the knowledge about these children is being supplemented and deepened and some etiopathogenetic conclusions may be drawn on basis of a larger statistical unit.

RÉSUMÉ

Fissures obliques de la face

Kubáček V., Pěnkava J.

Dans la préambule, on introduit la classification des fissures obliques selon de différents autres. Le travail original de Karfík est encore complété par 3 personnes atteintes de ce défaut. Les auteurs inclinent à croire — à l'égard d'une apparition très rare de ces malformations congénitales de développement — qu'il convient de renseigner les médecins sur chaque nouveau cas de fissure oblique et de compléter ainsi les information existantes pour pouvoir, à l'avenir, en tirer les conclusions quant à l'étiopathogenèse.

ZUSAMMENFASSUNG

Schräge Gesichtsspalten

Kubáček V., Pěnkava J.

Einführend wurde die Klassifikation der schrägen Geischtsspalten nach verschiedenen Autoren dargelegt. Die ursprüngliche Arbeit von Karfík wurde durch drei weitere, mit dem Defekt betroffene Kranke ergänzt. Die Autoren sind der Auffassung, dass es angesichts des seltenen Vorkommens dieser angeborenen Entwicklungsdefekte ange-

bracht ist, die medizinische Öffentlichkeit mit jedem neuen Fall der schrägen Spalte bekannt zu machen und somit die bisherigen Informationen zu ergänzen, damit es einmal möglich wird, Schlussfolgerungen über die Ätiopathogenese zu ziehen.

RESUMEN

Fisuras oblicuas de la cara

Kubáček V., Pěnkava J.

Al principio se menciona la clasificación de las fisuras oblicuas según varios autores. A la obra original de Karfík están añadidos tres otros casos de los afectados con este defecto. Los autores tienen la opinión de que respecto a la poca frecuencia de estos defectos de evolución sea conveniente enterar al público médico de cada caso nuevo de la fisura oblicua y completar así las informaciones existentes para que sea posible hacer conclusiones sobre la etiopatogénesis.

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FATAL THERMIC ACCIDENTS IN OLD PEOPLE

S. HÁJEK, R. VRABEC, H. TOPINKA

Burns in old people are marked by certain characteristic features unencountered in patients of other age groups. These concern not only the genesis of the injury, but also the progress of the disease, the therapeutic approach, expectancy of survival, the time of death after the accident and, last but not least, the cause of death.

The following paper is based on an analysis of a group of 133 deceased (75 men and 58 women) at the ages of from 15 to 90 years with second — and third-degree burns ranging from 1 to 99%. The age group pattern can be seen in Fig. 1.

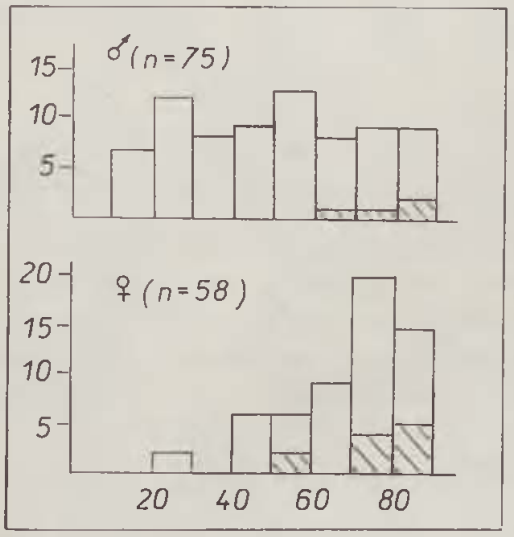
Fig. 1 shows the male group to be rather evenly distributed; the female group, in contrast, is marked by a pronounced increase in the higher and top age groups.

Information about the genesis of the injuries in our group is given in Tab. 1.

Quoted in Tab. 1 are the causes of thermic injury in men and women divided with a view to age: 15—60 year olds and 61—90 year olds. The "others" group of the burned includes thermic damage caused by the imflammation of clothes and underwear by a burning match, candle, in the course putting down fire, as a result of reduction valve explosion, fall into glowing ashes, caustic lime and eventually cases where the cause of the burn could not be safely established; in the scalded group the "others" line consists of those scalded by hot steam at work and by hot soup. It follows from the table that more than two thirds of the afflicted men were under the age of 60 and, on the other hand, more than three quarters of the afflicted women were over 60. In these women the predominant causes in the genesis of thermic injury included burns incurred in making fire, cooking and falls on hot ovens, and scalds sustained in the act of washing linen. A possible explantion is that because of their altered mental and physical state they are no longer capable of safely doing their household work and, as a results, prone to thermic injuries. In older and old men burns as a result of falling on hot ovens and scalds in-

Tab. 1

	Men		Women	
	15—60	61—90	15—60	61—90
Burns by naked flame:				
making fire and cooking	6	5	1	18
explosion of inflammable substance	17	3	8	2
inflammation of textiles by cigarette	2	5	1	1
others	14	2	—	10
Burns by metal:				
fall on hot stove	1	4	2	9
at work in steelworks	1	—	—	—
Burns by electric current	6	—	—	—
Scalds:				
in bath	1	4	—	1
in washing linen	—	—	—	3
others	4	1	1	1
Total	51	24	13	45



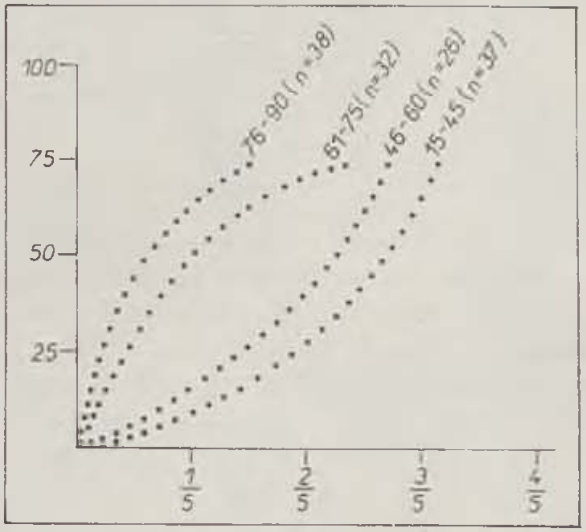


Fig. 1. Age distribution of the group. — The upper half shows the male group, the lower one the female group. The abscissas show the age in years, the ordinates the number of observations in absolute numbers. Hatching denotes cases of burns resulting from fall on hot stove in sudden illness. — Fig. 2. Distribution of group under observation regarding extent of burn and age of the burned. — The abscissa shows the extent of second- and third-degree burns in fractions of skin area involved, the ordinate indicating the rate of incidence in per cent. The graphs link the same age groups, as regards the abscissa up to the extent answering the respective fraction of the skin area. (Fractions of the skin area instead of the currently percentile indication was used here in order to better distinguish the area of the burn from the incidence rate which is given in per cent on the ordinate)

curred while taking bath were in the forefront of thermic injury geneses, a fact which can equally well be explained by the mental insufficiency of those afflicted of the higher and very high age groups.

Apart from the depth of the burn, the area, too, is an important basic factor in burns. Older people are generally known to be in grater danger quoad vitam even by relatively inextensive burns such as would cause little worry in patients of other age groups. The distribution of our group with a view to the area of the burn is shown in Fig. 2.

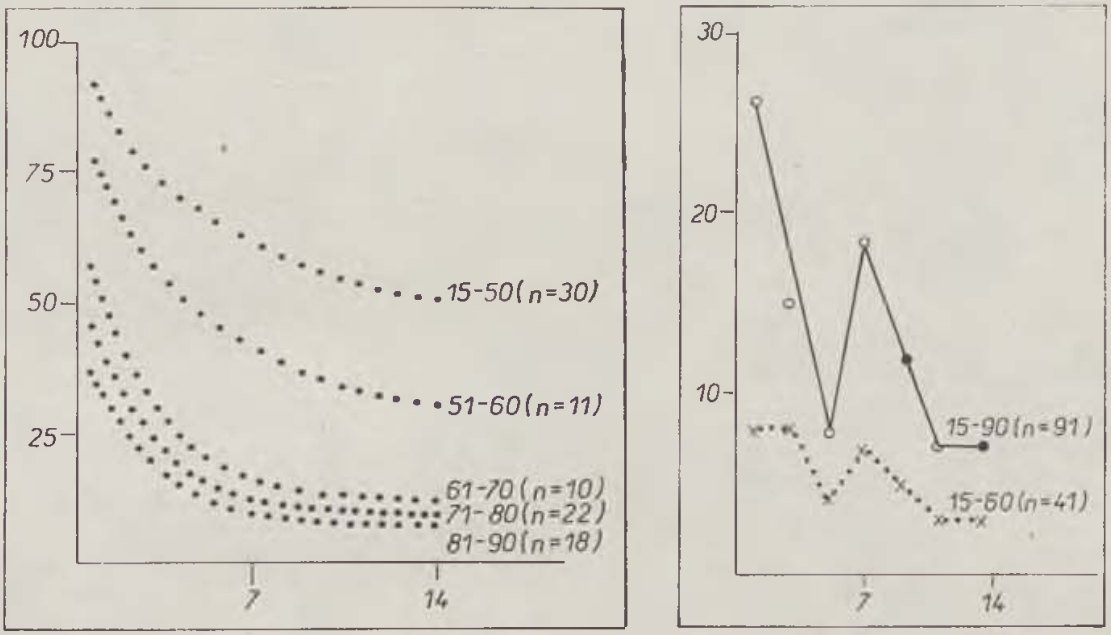


Fig. 3. Dependence of survival period and patients' age on the area of the burn. — The abscissa shows the time of death counted from the accident in days, the ordinate indicating the extent of the burned area in per cent. The graphs link the same age groups. — Fig. 4. Time of post-accident death during the first two weeks. On the abscissa is the time of death in days, on the ordinate the number of cases. Continuous line indicates all 91 patients at the ages of from 15 to 90 years, dash line the 41 patients in the 15—60 age group

It follows from Fig. 2 that curves for the same age groups undergo changes depending on the extent of the burn; as the age increases, so does the tangent of the respective tangent line. This means that in the higher age groups the number of patients with burns of smaller extent is on the increase. Thus, for instance, in burns involving up to one fifth of the skin area, the 15 to 45 year old group represented only 8% of the total, the 46 to 60 year old group — 12%, the 61 to 75 year old group — as much as 48% and the 76 to 90 year olds even 65%. The abovementioned values fully confirm the experience, already referred to, that the prognosis of the burn disease deteriorates considerably with the age rising above 60 and that old people tend to die as a result of relatively small burns. This conclusion is in full accordance with the rule

which makes for an approximate prognosis in burns: the probability of death in post-accident thermic patients is the sum of his age in years and the skin area involved in per cent (1).

An analysis of Fig. 3 is also conducive to the conclusion that in old people death is likely to come as a result of even small burns.

Fig. 3 makes it clear that the curves tend to be steeper as the age advances, which is particularly striking in patients over 60. This means that the post-accident survival period in middleaged and old people is substantially shorter than in younger people, given the same extent of the burn. Thus e.g. the 15—50 year olds with burns involving 50% of the skin area die on the

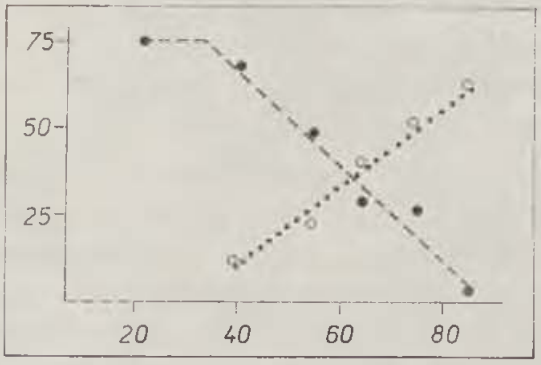


Fig. 5. Cause of death (circulatory insufficiency and sepsis) dependence on patients' age. — On the abscissa are age groups in years, on the ordinate the percentage of incidence rate of sepsis (dash line) and circulatory insufficiency (dotted line)

average on about the 20th day after the accident, while patients over 60 with the same skin area involved die already in the course of the first day.

The dependence of the prognosis on the extent of the area involved and the patient's age is even more striking if the "LA_{50}" values are applied (3). LA_{50} is such an area of the burn which makes 50% of those afflicted die. In each particular age group LA_{50} is represented by that kind of value, given in per cent of the area involved, which makes the curve run parallel with the abscissa; this is, e.g. 45% in the 15—50 age group, 25% in the 51—60 age group, 13% in the 61—70 age group, 10% in the 71—80 age group and 7% in the 81—90 age group in second- and third-degree burns. It will be seen that the LA_{50} value decreases with advancing age, which is in full accordance with conclusions in Fig. 2.

An interesting piece of knowledge appeared as a result of studying the higher age groups' share in deaths occurring in the course of the first fourteen days after the injury. During that period, 65.0% of the 15—60 age group died and 71.4% of the 61—90 age group. Deaths during the first two post-accident weeks are shown in Fig. 4.

In Fig. 4 the curves are marked by two apices, the first of which, co-inciding with the 1st—2nd days after the injury, is conditioned by shock and

circulatory insufficiency, the second one, culminating on the 7th post-accident day, is conditioned primarily by focal pneumonia. It will also be seen that it was to a great extent patients over 60 years of age who were mainly responsible for the apices; outside the apices the number of deaths in the 15—60 year age group and in the 61—90 group was practically the same.

There were remarkable differences in comparing the causes of death in patients of different ages. In our group the most frequent causes of death included circulatory insufficiency, sepsis and shock. About a third of those affected died of circulatory insufficiency conditioned by diseases of the heart and the large arteries. The second third died of sepsis, most frequently caused by Staphylococcus aureus, sometimes in combination with S. proteus; Pseudomonas aeruginosa took a less frequent part in its genesis. About a fifth of those afflicted died as a result of uncontrolable shock (2). The interdependence of the two most frequent causes of death, i.e. circulatory insufficiency and sepsis and the patients' age is shown in Fig. 5.

It follows from Fig. 5 that there are fewer deaths caused by sepsis as the patients grow older, but more as a result of circulatory insufficiency. This can well be explained by the fact that as the age advances so does the proportion of those affected who suffered from circulatory disorders even prior to the accident and in whom the injury induced decompensation of the existing disease; as will be seen from Fig. 4, such patients tend to die often soon after the accident thus leaving no time for the sepsis to develop.

SUMMARY

An analysis was carried out of a group of 133 burned (75 men and 58 women) at the ages of from 15 to 90 who died as a result of thermic injury. Particular attention was paid to middleaged and old patients, to the genesis of their injuries, their representation within the group, to the prognosis of their disease given a different extent of the burn, to their deaths during the first two weeks following the accident and to the cause of death. Unlike that of younger people, the genesis of thermic injuries in old people was marked by a high incidence of burns resulting from keeping fire in stoves, falling on hot stoves, and scalds in women in washing linen, fall on hot stove and scalds in taking bath in men. With the age rising over 50 there was an increasing number of patients who died while the extent of the skin area involved kept gradually diminishing. During the first two weeks, the mortality of the 15—60 year old was 65%, in the 61—90 year old — 71%. Mortality was at its highest during the first and second days after the accident (shock and circulatory insufficiency) and on the 7th post-accident day (focal pneumonia). Patients over 60 years of age had a greater share in the mortality rate. A comparison between the two most frequent causes of death — sepsis and circulatory insufficiency — proved advancing age to be accompanied by a higher proportion of deaths as a result of circulatory insufficiency with the number of deaths as a result of sepsis falling.

RÉSUMÉ

Accidents thermiques meurtriers chez les hommes âgés

Hájek S., Vrabec R., Topinka H.

On a fait l'analyse d'un ensemble de 133 brûlés (75 hommes et 58 femmes) de l'âge de 15 à 90 ans qui ont été morts par suite d'un accident thermique. On prêtait attention surtout aux affectés d'un certain âge ou bien trés âgés, à la genèse de leur accident, à leur représentation dans l'ensemble, à la prognose de leur affection en cas de brûlures d'une extension différente, à leur décès pendent les premiers quinze jours après l'accident et à la cause du décès. Dans la genèse des accidents thermiques des hommes âgés, c'étaient les brûlures à cause du chaufage dans le poêle, puis c'était la chute sur le poêle rougi et l'échaudure pendant le lavage chez les femmes et la chute sur le poêle rougi ou l'échaudure pendant la baignade chez les hommes qui occupent la première place. Avec l'âge montant s'augmentait le nombre de personnes affectées qui sont mortes aussi en cas de dimension réduite de la surface brûlée. Pendant les premiers quinze jours, les personnes affectées du groupe de l'âge de 15—60 ans sont mortes dans la proportion de 65%, du groupe de l'âge 61—90 dans la proportion de 71%. La mortalité maximum se présentait le premier et le deuxième jour après l'accident (choc et insuffisance circulatoire), puis le septième jour aprês l'accident (bronchopneumonie). Cette mortalité concernait pour la plupart les malades âgés plus de 60 ans. La comparaison de deux causes les plus fréquentes de la mort — celle de l'insuffisance circulatoire et de la septicaemie — a montré que, avec l'âge montant, le nombre de décès par suite de l'insuffisance circulatoire augmentait tandis que le nombre de décès par suite de la septicaemie baissait.

ZUSAMMENFASSUNG

Tödliche thermische Unfälle bei alten Leuten

Hájek S., Vrabec R., Topinka H.

Es wurde die Analyse einer Aufstellung von 133 Verbrannten (75 Männer und 58 Frauen) im Alter von 15 bis 90 Jahren unternommen, die an die Folgen eines thermischen Unfalles gestorben sind. Besondere Aufmerksamkeit schenkten die Autoren betroffenen Individuen im höheren und hohen Alter, der Genese ihres Unfalles, ihrer Vertretung in der Aufstellung, der Prognose ihrer Erkrankung bei verschiedenem Umfang der Verbrennung, ihrem Tod während der ersten 14 Tage nach dem Unfall und der Todesursache. In der Genese der thermischen Unfälle bei alten Leuten gehört, im Vergleich mit jungen Leuten, eine bedeutende Stellung der Verbrennung bei der Ofenheizung, dem Sturz auf glühenden Ofen und der Verbrühung beim Wäschewaschen bei Frauen, und dem Sturz auf glühenden Ofen und der Verbrühung beim Baden bei Männern. Mit steigendem Alter über 50 Jahre stieg die Zahl der Betroffenen, die bei allmählich sinkendem Umfang der verbrannten Fläche starben. Binnen der ersten 14 Tage starben in der Gruppe der 15—60-jährigen 65 %, in der Gruppe der 61—90-jährigen 71 % der Betroffenen. Die höchste Sterblichkeit war am 1.—2. Nachunfallstag (Schock und Kreislaufinsuffizienz) und am 7. Nachunfallstag (Herdpneumonie). An dieser Sterblichkeit beteiligten sich im grösseren Umfang Betroffene im Alter über 60 Jahre. Der Vergleich zwischen den zwei häufigsten Todesursachen — Kreislaufinsuffizienz und Sepsis — hat gezeigt, dass mit steigendem Alter auch die Zahl der Todesfälle wegen Kreislaufinsuffizienz ansteigt, während die Zahl der Todesfälle nach Sepsis herabsinkt.

RESUMEN

Accidentes fatales térmicos en personas de edad avanzada

Hájek S., Vrabec R., Topinka H.

Fue hecho un análisis del conjunto de 133 quemados (75 varones y 58 hembras) en la edad de 15 a 90 años que murieron a consecuencia de un accidente térmico. Atención especial fue prestada a los afectados viejos y muy viejos, a la génesis del accidente de los mismos, a su representación en el conjunto, a la prognosis de su enfermedad con la extensión diferente de la quemadura, su muerte durante los primeros quince días después del accidente y a la causa de la muerte. En cuanto a la génesis de los accidentes térmicos de personas más viejas, en comparación con los jóvenes, las causas que tenían un lugar significante eran en las hembras las quemadura sufridas al hacer fuego en la estufa, la caída a la estufa ardiente, las escaldaduras al lavar la ropa, en los varones la caída a la estufa, las escaldaduras al bañarse. Con la edad avanzada a más de 50 años aumentaba el número de los afectados que murieron en los casos de quemaduras con extensión gradualmente disminuída. Durante los primeros quince días murieron 65% del grupo de los de 15—60 años, 71% del grupo de los afectados de 61—90 años. El máximo de mortalidad fue el 1.^{0}—2.^{0} día después del accidente (un choque e insuficiencia circulatoria) y el 7.^{0} día después del accidente (bronquiopneumonía). Los afectados más viejos que 60 años participaban en esta mortalidad en mayor medida. En la comparación de las dos causas de la muerte más frecuentes — de la insuficiencia circulatoria y de la septicemia — se mostró que el número de los fallecimientos a consecuencia de la septicemia baja.

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RECONSTRUCTION OF THE DORSUM NASI BY OSTEPERIOSTEAL GRAFT

S. DITRÓI

Parallel with the number of traumata growing steadily in our century, cranio-facial injuries have become more frequent and more serious. As regards of the facial skeleton, injuries of the nasal bone are especially numerous since it is the most projecting part of the face. Inadequate treatment of the traumatic nasal bone leads to undesirable functional and aesthetical results. The most frequent of such results is the saddle nose, especially if comminuted fracture is followed by sequestration which may fulminantly deform the bridge.

The correction of the post-traumatic nasal deformities belongs to the sphere of reconstructive surgery. The majority of saddle noses surgically managed in this department were of traumatic origin (industrial, traffic and sports — boxing — accidents).

Zoltán emphasized in 1967 the significance of distinguishing between saddle and shrunken noses. Saddle nose is understood to mean complete or partial depression of the bridge owing to insufficiency of the supporting tissues, while the covering skin and the mucosa remain intact, whereas both skin and mucosa are insufficient in the shrunken nose. It is therefore imperative to replace the inner lining before remedying the outer defect.

Surgical correction of saddle noses consists in the replacement of the rhinoskeleton by the implantation of different tissues or other substances.

Of recent, surgeons in favour of alloplasty implant polyethylene, polymethacryl and other polymerization products (Dencer, 1955), paladon grafts (Beckmann, 1950), or silastic (Milward, 1972) under the skin of the dorsum nasi. Of the heterografts, bovine bones are most frequently used (Gillies and Kristensen, 1951). Attempts at employing homografts (Reidy, 1956) have generally yielded unsatisfactory results.

In view of the insufficiency of the other procedures most of the authors prefer the method of autografting. Two kinds of tisseu are used for this purpose, namely cartilage (Gibson and Davis 1958) and bone (Gerrie, et al 1950). Cartilaginous tissue is implanted in a linear or L-shaped form (Fig. 1).

This method has the disadvantage that the transplanted cartilage cannot be immobilized and is often deformed.

Osseous grafts have the advantage of becoming reliably immobilized by way of synostosis with the bony host tissue. The piece of bone to be transplanted is taken by some authors from the iliac crest (Dingman, 1950), by others from the scapula (Schmid, 1952), or the tibia (Farina and Willano, 1971). The shape of the bony graft remains unchanged and its size is not reduced by absorption if, according to Erczy (1954) its portion situated in the soft tissues is completely enwrapped in its own periosteum.

Fig. 1. Correction of nasal deformity by costal cartilage

When dealing with serious cases of saddle nose deformity we employ periosteally covered cortical bone for the purposes of transplantation as recommended by Erczy and Zoltán (1958) and then by Bethmann and Zoltán (1968). The graft is carved out of the anterior crest of the tibia and tailored to the desired shape and size. Transplants taken from the anterior border of the tibia seem to be particularly suitable for an aesthetically pleasing reconstruction of the dorsum nasi. It was in 35 cases that we used tibial graft and its periosteum for the reconstruction of the rhinoskeleton (32 saddle-, and 3 shrunken noses). But for three exceptions, healing was smooth and cosmetically fautless (Figs. 2—3).

Of the three unsuccessful cases one was caused by absorption of the graft owing to inadequate periosteal covering.

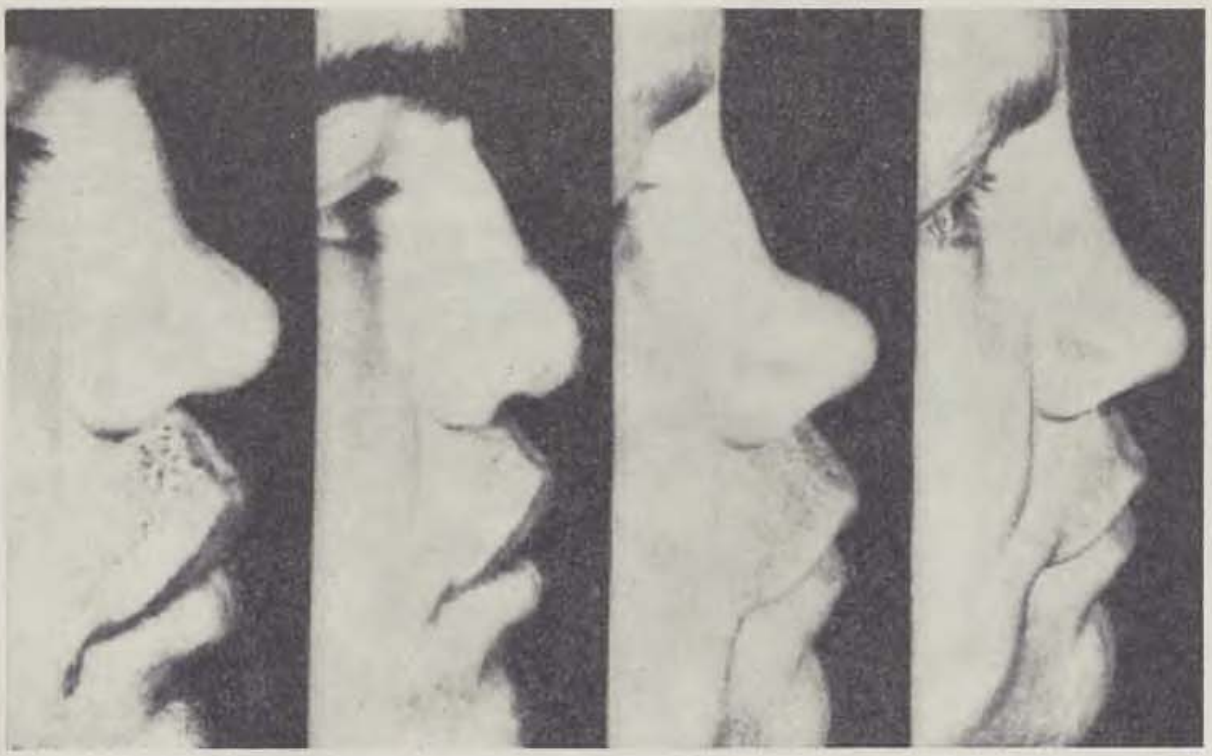

Fig. 2

Fig. 3

Figs. 2—3. Correction of saddle noses by tibial bone graft

The other patient was pregnant, and the implanted piece was expelled. Reoperation after delivery was successful.

Tibial graft in the third case was used for the correction of a shrunken nose after preceding replacement of the nasal mucosa by means of a pedicle flap rolled down from the forehead. The development of suppuration and cholesteatoma a year later were due to inadequate removal of the epithelium. Together with the removal of the cholesteatomous flap, partial resection of the satisfactorily immobilized viable graft became necessary. The implanted bone, organized, had remained viable in the purulent milieu (Fig. 4).

Fig. 4. Histological picture of tibial bone graft resected a year after its implantation to the nose

We propose to expatiate in the following upon certain details regarding our views and practice in connexion with the operation.

The setting up of a *surgical plan* and the preparation of a moulage of the deformed nose are of prime significance. The plaster mould enables the surgeon to perform precise measurements which, together with the post-operative plaster model afford reliable documentation.

The *incision* should be so made as to ensure good exposure and aesthetically satisfactory cicatrization. We do not favour endonasal approach or Réthi's (1928) incision and prefer Kazanjians's (1948) method of infraapical approach as modified by us.

The actual *site of grafting* has to be prepared carefuly. There must be room enough to accomodate the implanted bone lest, by its pressure or too superficial position, it should necrotize the skin of the nose.

Sercer (1962) immobilizes the graft by placing it in a pouch made between the nasal bone and the periosteum. The latter adheres so closely to the factured bone after injuries that it is impossible to detach it and prepare a pouch. This is, as a matter of fact, not necessary because — as is the case in our practice — if the periosteum is shoved down and the surface of the bone

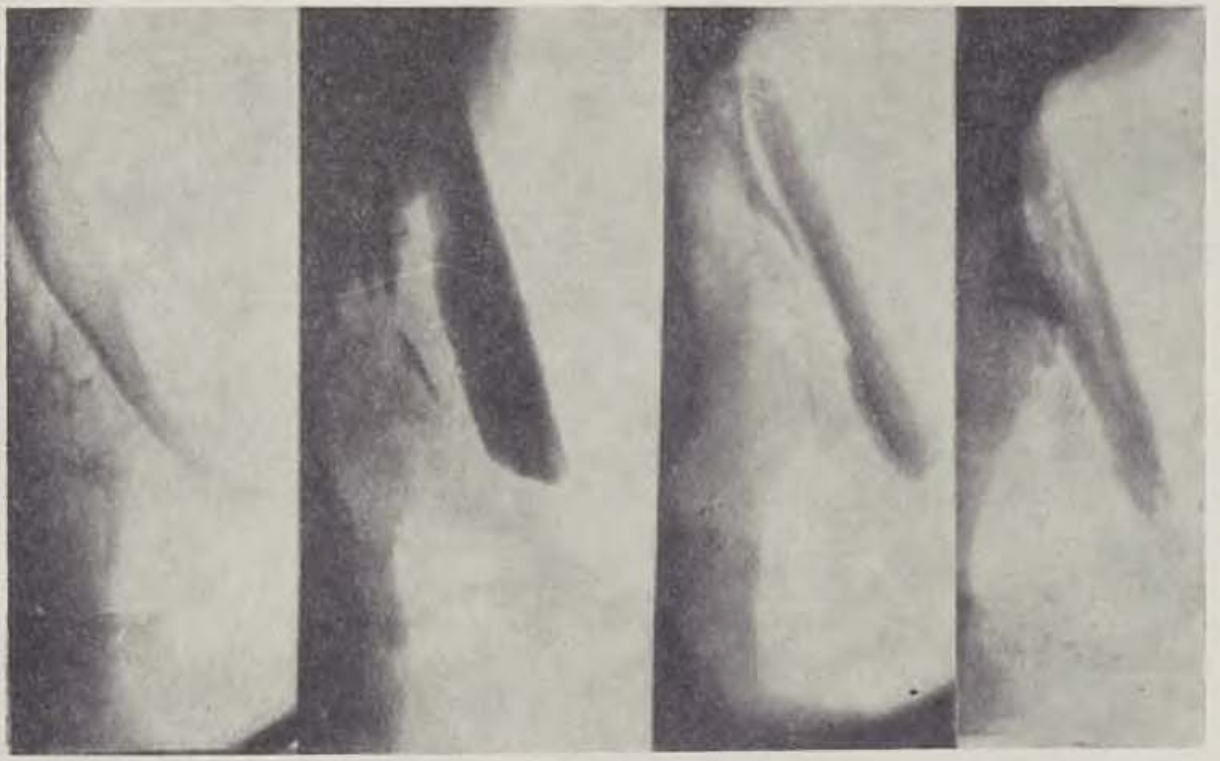

Fig. 5. Radiographs made after transplantation

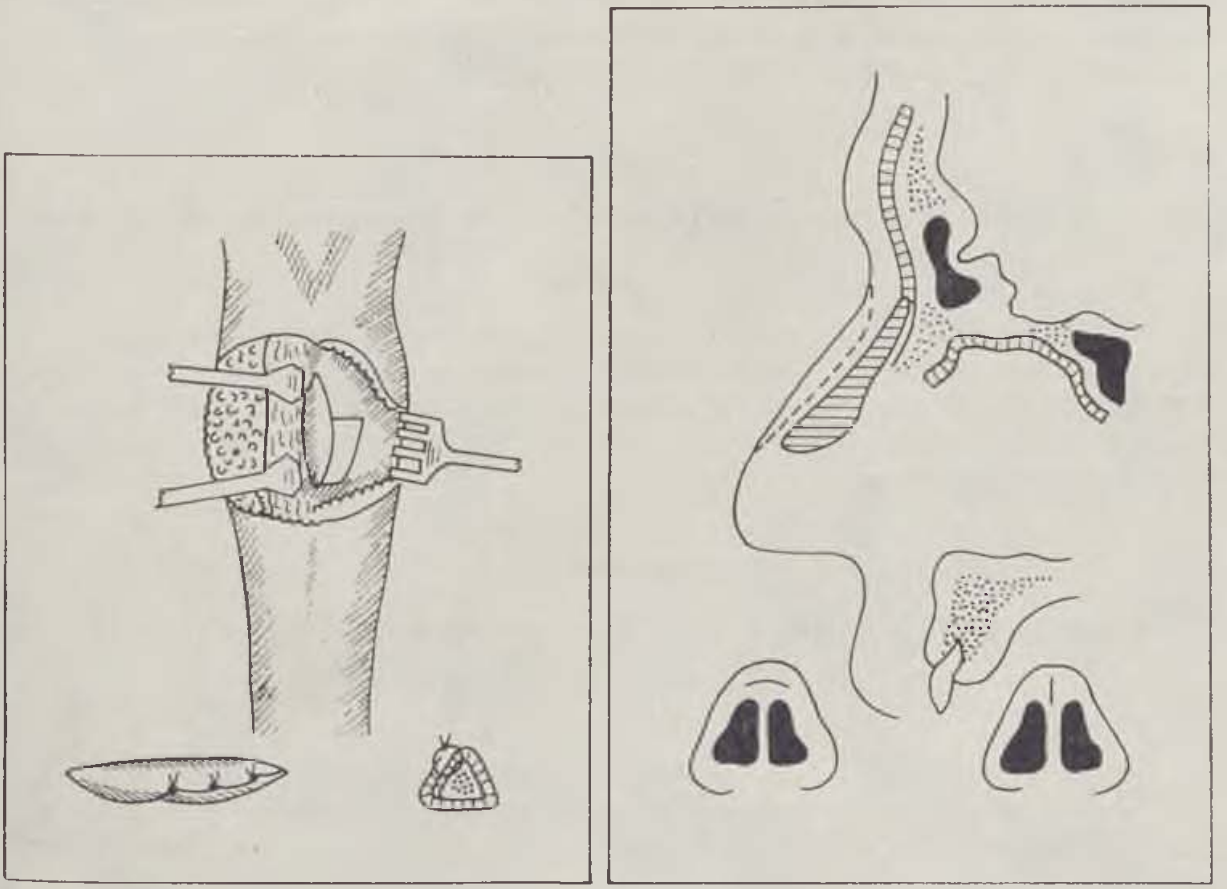

Fig. 6—7. Preparation of the graft and its position in the recipient pouch

chiselled, the implanted piece will become osseously united with the recipient bone in about three months (Fig. 5). Synostosis is promoted if the graft reaches the level of the glabella. The union of the bones is facilitated if — as in our practice — a fixed dressing is applied. Its material is Stent's composition softened in hot water which, when solidifying on getting cooler, assumes the shape of the nose. Also quickly setting Cellona plaster may be better. Fixation lasts 14 days.

Preparation of the graft. After the site of reception has been taken care of, a curved skin incision is made in the upper third of the leg through which the border and the articular surface of the tibia are exposed. The periosteum is then so cut round in the precisely circumscribed area of the transplant that only the dorsal surface of its portion in contact with the wound is covered, while the portion coming to lie between the soft tissues is completely wrapped in a periosteal flap (Fig. 6).

The cut surface of the bony graft is then turned towards the nasal bone and placed in the pre-formed pouch. Special care is taken to achieve precise coaptation of the bony surfaces (Fig. 7).

SUMMARY

A periosteally covered piece of the tibia has been used in 35 cases for the reconstruction of the dorsum nasi. In 32 cases the intervention was performed to correct saddle noses, in 3 cases on account of shrunken noses. Results were both functionally and aesthetically satisfactory.

RÉSUMÉ

Emploi de plaque d'os couvért de périoste dans la reconstruction de l'os nasal

Ditrói S.

Analyse des résultats obtenus au cours de 35 interventions reconstructives de l'os nasal, executées avec la transplantation de la plaque tibiale couverte de périoste. La plaque tibiale fut appliqué pour la correction du nez camard en 32 cas, et au cours de l'intervention sur nez rétreci en 3 cas. Au point de vue fonctionel et esthétique les résultats sont satisfaisants.

ZUSAMMENFASSUNG

Verwendung von periostbedeckten Knochenspan in der Rekonstruktion des Nasengerüstes

Ditrói S.

Bericht über die Ergebnisse der mit Periost bedeckten Tibiaspan-transplantation, welche in 35 Fällen bei der Rekonstruktion des Nasengerüstes verwendet wurde. Der Tibiaspan wurde in 32 Fällen zur Korrektion der Sattelnase, in 3 Fällen bei der Schrumpfnasenoperation benützt. In funktioneller und ästhetischer Hinsicht waren die Ergebnisse befriedigend.

RESUMEN

Aplicacion de un liston oseo revestido de periostio para la restitucion del armazon de la nariz

Ditrói S.

El autor de a conocer sus resultados obtenidos en 36 intervenciones quirúrgicas de restitución del armazón de la nariz, transplantando listones de hueso revestido de periostio, sacados de la tibia. En 32 casos ha aplicado los listones oseos de la tibia para la corrección del lomo de la nariz y en 3 casos en rinoplásticas de narices contraídas. Los resultados del autor son buenos, tanto en el aspecto funcional, como en el estético.

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First Course about Traumatology, organized by the Spanish Society of Plastic Reconstructive and Aesthetic Surgery and directed by Dr. A. Alfaro.

This course will be held in Bilbao (Spain) during the days 13—16 of November, 1974.

Information: Dr. Antonio Alfaro Fernández, Servicio de Cirugía Plástica Ciudad Sanitaria "E. Sotomayor", CRUCES — Baracaldo — Vizcaya — SPAIN.

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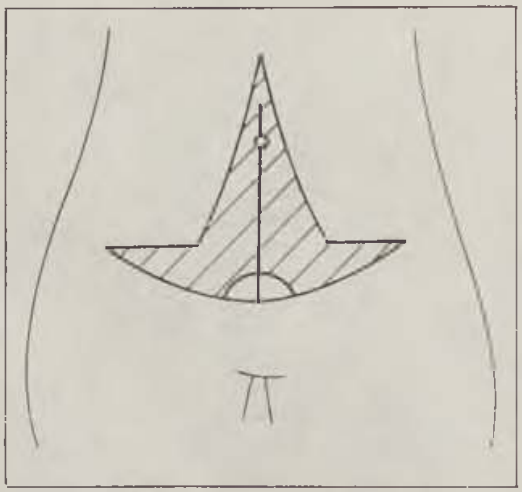
RECONSTRUCTION OF THE ABDOMINAL WALL AT VENTER PENDULUS

J. ČERVENÝ

Plastic and general surgeons, perform the operation of venter pendulus, rather frequently. There is a continuously rising number of female patients, the women request the operation either for cosmetical reasons or, especially older women, for health reasons.

Its formation is mostly due to pregnancy and loss of weight after excessive fatness. The degree of affliction varies from skin folds with the fat pad thinning in the mesogastrium, to typical venter pendulus. The navel is either indrawn or — at simultaneous diastasis of the direct muscles with thinned subcutaneous fat layer — it is flat up to prominent. Thus surgical repair requires not only resection of the excessive skin and subcutaneous fat in transverse and lengthwise direction, it is also essential to suture the direct abdominal muscles in the entire length of the diastasis. It is impossible to achieve good results without this repair. Suture of the direct muscles requires that



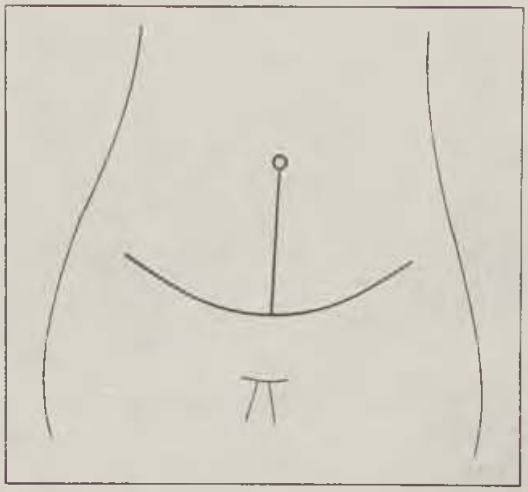


Fig. 1. — Fig. 2. The original incision in form of a reversed T as it is applied at the Department of Plastic Surgery in Prague

the muscels are exposed in the entire course of the diastasis, which is usually especially distinct in the mesogastrium.

At the Department of Plastic Surgery in Prague, we carry out anchor-like resection of skin and fat, with suture of the diastasis of the direct muscles without opening the abdominal cavity, placing the navel in appropriate height and shifting the tissues of the abdominal wall. (Fig. 1 and 2.)

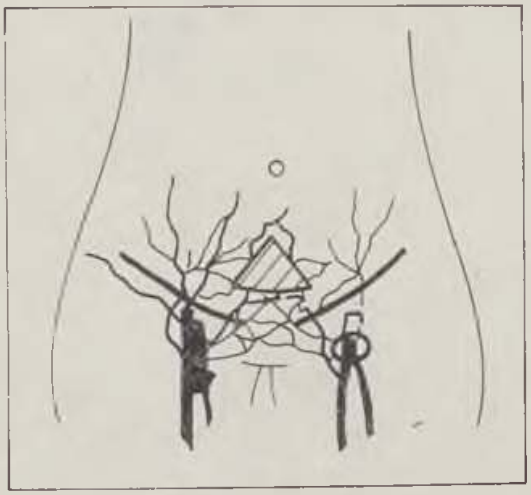


Fig. 3. Scheme of the vascular supply at the lower end of the operated-on region marking the place of frequent necrosis

The operation is of good cosmetic effect, but necrosis of the skin and hypodermis occurs sometimes at the lower end of the vertical suture under the effect of stasis of the blood and lymph and anoxia due to stasis.

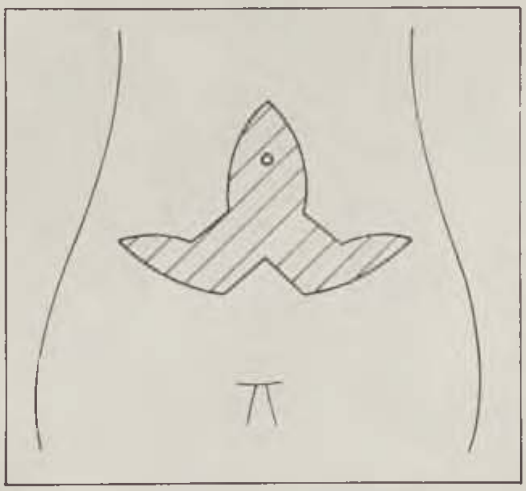


Fig. 4. — Fig. 5. Proposition of the new type of surgical incision

Vascular supply of the skin and hypodermis in the hypogastrium, is predominantly carried out from branches aa et vv epigastricae superficiales. The hypodermis is also supplied by arteries and veins passing through the abdominal fascia from aa et vv epigastricae caudales. The central part of the suprapubic region is almost solely supplied from aa et vv pudendales externae,

the independent branches from aa et vv femorales. Decay, stasis and necrosis of skin and hypodermis occurs sometimes just in this region marked on Fig. 3 by a cross-hatched triangle.

Long years of experience and the anatomic conditions in the operated-on region induce us to recommend the undermentioned method of operation. (Fig. 4 and 5.)

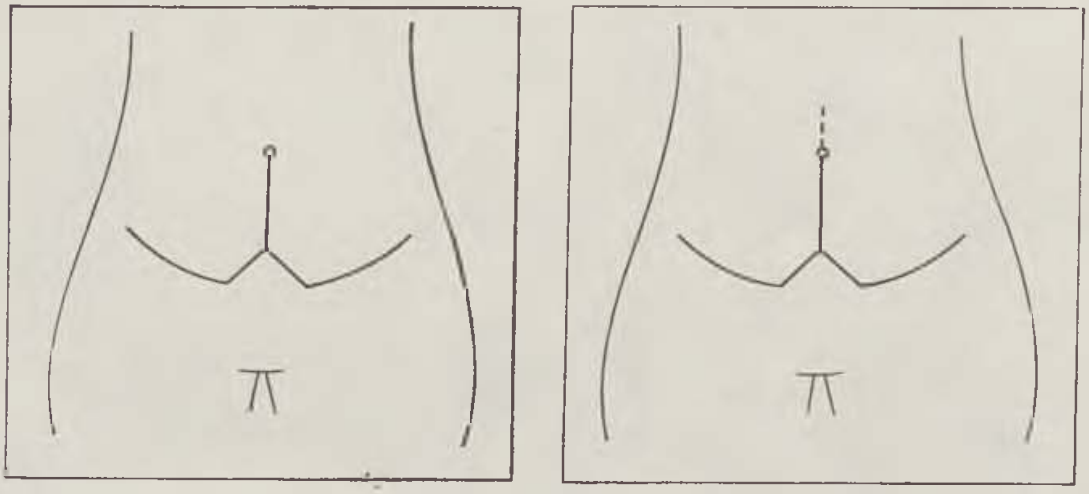


Fig. 5

The proposition is based on the anatomic situation in the region of the field of operation and removes thus the most frequent causes of postoperative complications. As demonstrated on the figure, we carry out a vertical convex incision on both sides of the central line with its peak mostly in the place

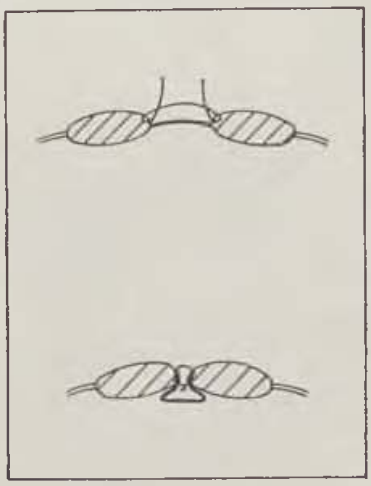


Fig. 6. — Fig. 7. Technique of stitches in closure of the diastasis of the direct abdominal muscles and the resulting condition

where the navel will be situated. The degree of convexity of the incision depends upon the amount of excessive skin and hypodermis and on the extent of diastatis of the direct muscles. By forming blunt flaps we achieve excellent blood supply through the shifted skin flaps and the subcutaneous fatty tissue

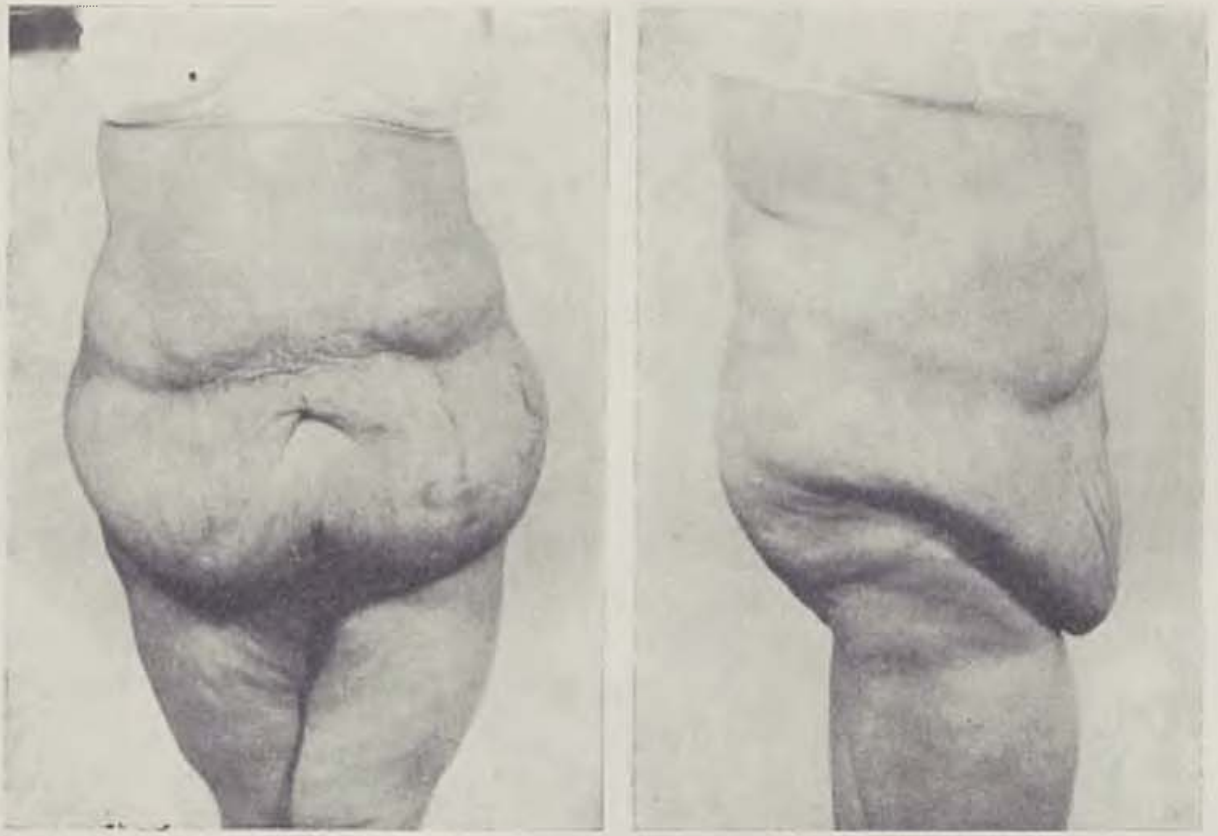


Fig. 8. — Fig. 9. Heavy degree of venter pendulus with diastasis of the direct abdominal muscles prior to the operation

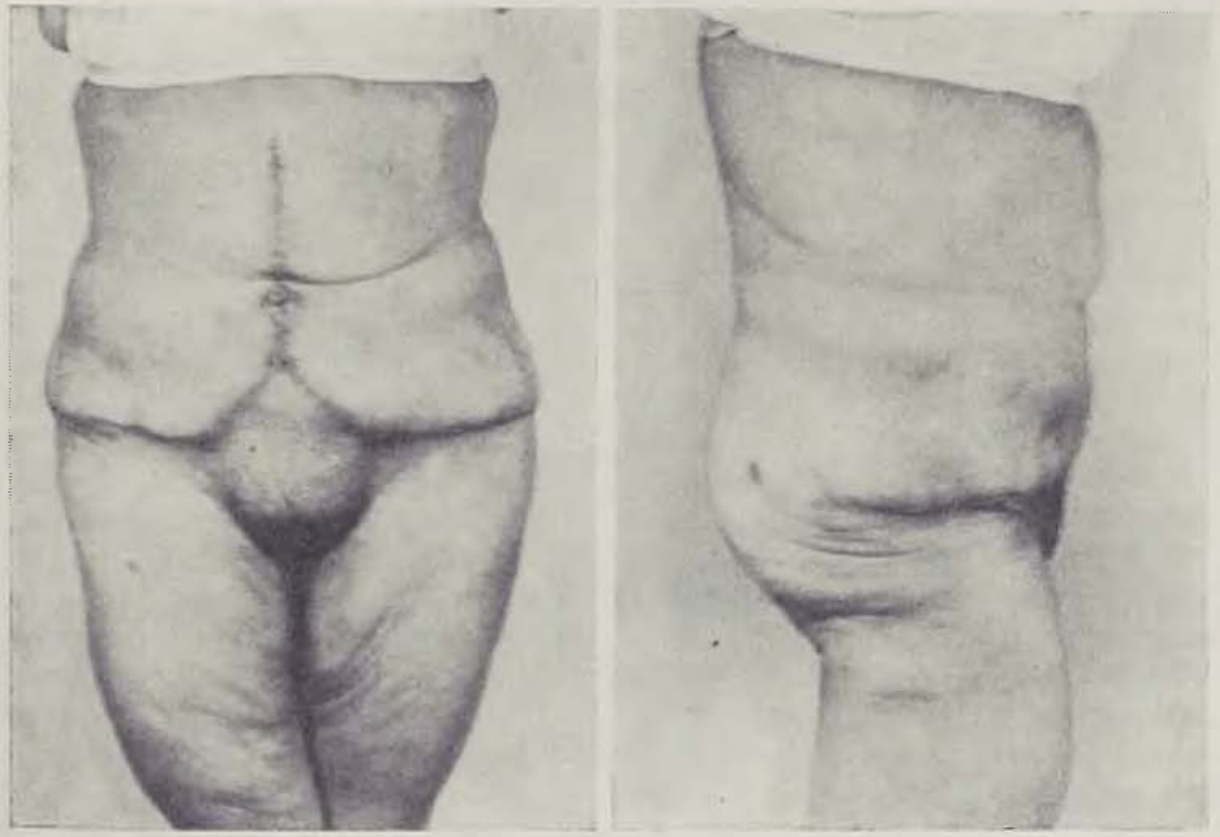
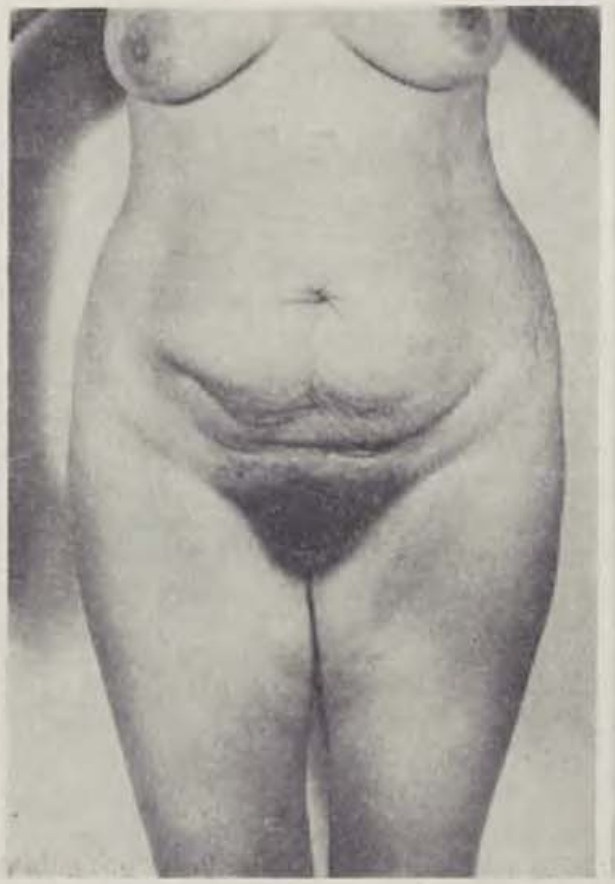


Fig. 10. — Fig. 11. Postoperative condition when the new method is applied



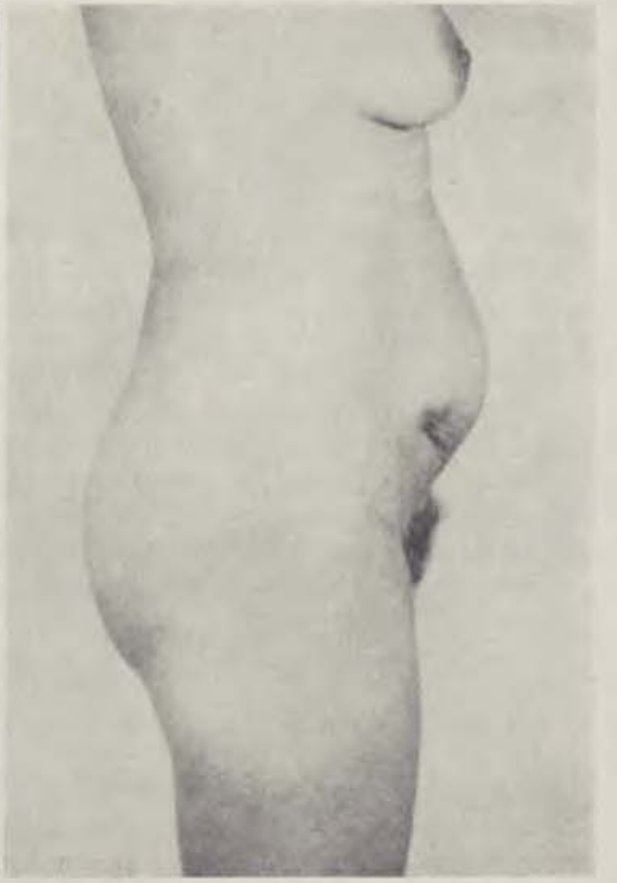


Fig. 12. — Fig. 13. A lighter degree of damage to the abdominal wall with diastasis of the direct muscles prior to the operation

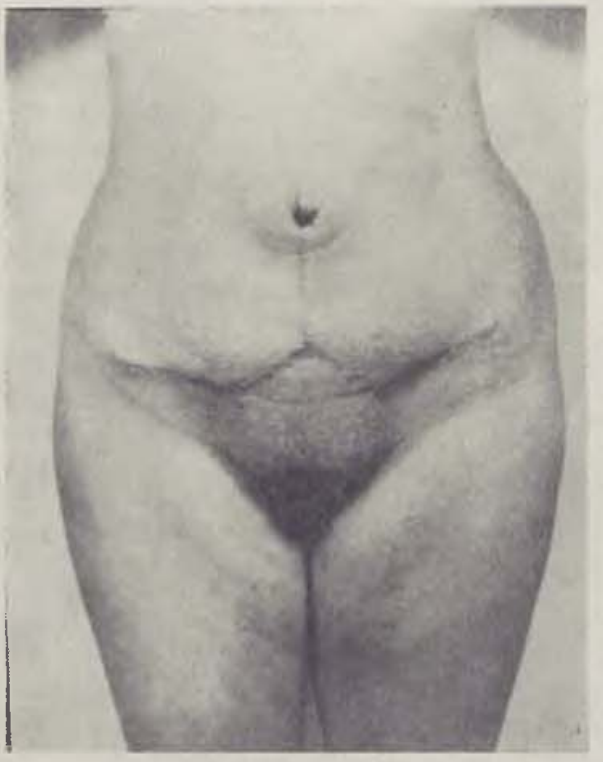


Fig. 14. — Fig. 15. The same patient after the operation

freed to a large extent from the fascia of the abdominal wall. We suture the diastasis of the direct muscles alternately by catgut and monophil silon, with the knots turned inwards. (Fig. 6 and 7.)

We take care, not to press the navel together and we close possible umbilical hernia. We suture only the medial rims of the direct muscles.

A triangle of skin and hypodermis with very good vascular supply from aa et vv pudendales externae, is formed by the incision at the lower pole of the wound. It is an isosceles triangle of 5—6 cm height and 9—12 cm at the base. We decide its size according to the degree of damage and according to the physical constitution of the patient. It acts simultaneously as a pillar on which the haematoma, lymph and possibly further liquids later, flow to the sides and empty then further away from the centre, where they cannot threaten the vertical suture any more. We remove the fat layer from the flaps of skin and hypodermis shifted from both sides up to the fascia Scarpae and suture by means of catgut to the abdominal fascia, in order to decrease the tension in the central line.

The fascia Scarpae forms a coherent layer caudally from the navel and passes via inguinal ligament to the front area of the femur where it is attached to the fascia lata femoris. It passes around the external genital on the perineum as fascia perinei superficialis. The fascia scarpae divides the fat pad in the hypogastrium so that two third are located superficially and one third is under the fascia.

We suture the skin first subcutaneously and then by normal stitches, introducing capillary drainage in the transverse incision and introducing Redon drainage at both ends of the horizontal suture.

The described method affords — besides perfect reconstruction of the abdominal wall — also greater shifting of skin and hypodermis, as well as better modelling of the hips without fears that the increased tension may threaten the suture. The lengthwise scar is unfortunately a necessary evil which is balanced, however, by better immerging of the navel into a stronger fat pad, pushed nearer from both sides of the abdominal wall. The surgical results achieved so far by this method suit us fully. The take occurs without complications. So far we have performed the operation on 21 patients.

We should like to contribute by the proposed operation to improvement of the surgical results and to a decrease of the postoperative complications especially in more serious cases and we are aware that the decision on the surgical method will always depend upon the degree of damage to the abdominal wall and on the decision of the surgeon about the most satisfactory procedure.

SUMMARY

The author suggests a new adaptation of the surgical incision at operation of venter pendulus. The incision forms a triangle of skin and hypodermis at the lower pole of the wound, where sometimes postoperative complications occured. This affords also the possibility of a convex lengthwise incision

forming blunt flaps of skin and hypodermis, which possess good blood supply. Application of this method proved satisfactory results so far and the take occurs without complications.

RÉSUMÉ

Reconstruction de la paroi abdominale en cas de venter pendulus

Červený J.

L'auteur propose une nouvelle adaptation du coup opératoire en cas de l'opération de venter pendulus. L'incision fait un triangle de la peau et du tissu subcutané situé dans le pôle inférieur de la plaie où se présentaient les complications postopératoires. Ça rend possible même de faire le coup longitudinal à la ligne arquée et de former des cuspides obtuses des lambeaux de peau et de tissu subcutané transférés qui sont bien pourvus de sang. Les résultats obtenus jusqu'à présent de l'utilisation de cette méthode sont satisfaisants, la guérison se passe sans complications.

ZUSAMMENFASSUNG

Wiederherstellung der Bauchwand bei venter pendulus

Červený J.

Der Autor entwirft eine neue Modifikation des Operationsschnittes bei der Operation wegen venter pendulus. Der Schnitt bildet ein Dreieck von Haut und Unterhaut im unteren Wundenpol, wo es zu Nachoperationskomplikationen gekommen war. Dies ermöglicht bogenartige Leitung des Längsschnittes mit der Bildung stumpfer Zipfel der bewegten Haut- und Unterhautlappen, die mit Blut gut versorgt werden. Die bisherigen Ergebnisse mit der Anwendung dieser Methode sind befriedigend, die Heilung erfolgt ohne Komplikationen.

RESUMEN

Reconstrucción de la pared abdominal en el caso del venter pendulus

Červený J.

El autor propone un reajuste del corte operativo en la operación del venter pendulus. El corte forma un triángulo de la piel y del tejido subcutáneo situado en el polo inferior de la herida, donde se presentaban las complicaciones postoperativas. Así se facilita una línea arqueada del corte longitudinal con formación de cabos obtusos de los lobos cutáneos y subcutáneos bajo translación que están bien provistos de sangre. Los resultados del empleo de este método son hasta el presente satisfactories, la curación transcurre sin complicaciones.

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TENDON PROSTHESIS

S. S. TKACHENKO, V. S. DEDUSHKIN, A. Y. BELOUSOV

In surgery the necessity frequently arises to reconstruct damaged organs and tissues. However, the function of the reconstructed organ often cannot be restored from its own tissue resources. Together with transplants of homo- and heterologous tissue, in recent years alloplastic materials have been employed in these cases all over the world.

With the development of the chemistry of plymers, new synthetic materials have been developed, which are suitable for the reconstruction of certain tissues and organs. Thus plastic surgery has taken a new direction in the application of endoprostheses.

It is well known that the fate and role of an implant is mostly determined by its degree of inertia. This quality of a foreign body is particularly important when it is used as substitute for tissues of anatomical structures, like tendons.

Taking into account the frequent failures of auto- and homoplasty of hand finger flexors in the tendon sheaths, the authors conceived to try out plastic material of some synthetic substances. They were lead by certain good results in the use of endoprostheses, the advantages of which are chiefly the fact that these materials are well available, variform in quality and shape and may be easily stored and sterilized.

The application of prostheses to tendons has an almost hundred-year-old history, during which experiments were carried out in bridging a defect in a tendon with silver wire, silk thread, horse hair, braided network of tantalum wire, nylon thread in a polyethylen tube, etc. However, a detailed study of the possibility of this kind of tenoplasty has only been started in the last ten years (Lokshina, 1965; Dedushkin, 1969; Demichev, 1970 and others).

Only a few of the authors referred to above succeeded in achieving good results. Taking into account their experience, the authors of the present study have made it their task to study: a) the reaction of the tendon and the surrounding tissue to some synthetic substances; b) the dynamics of restoration of function of the limb and to give a morphological picture of the regenerative processes taking place in the tendon after fitting with a prosthesis; c) the

possibility of employing synthetic materials for the plastic reconstruction of tendons under clinical conditions.

For fitting a tendon with a prosthesis, polyester fibres (Lavsan, Terylene) because of their firmness and stability were chosen as material, as well as Letilan*.

This material was chosen because of the antibacterial influence of its fibres on staphylococci, bacillus coli and proteus vulgaris due to the freeing of a substance of the nitrofurane group, i.e. furlacroleine (Sokolov, 1967; Tarasov et Boldasov, 1967 and others).

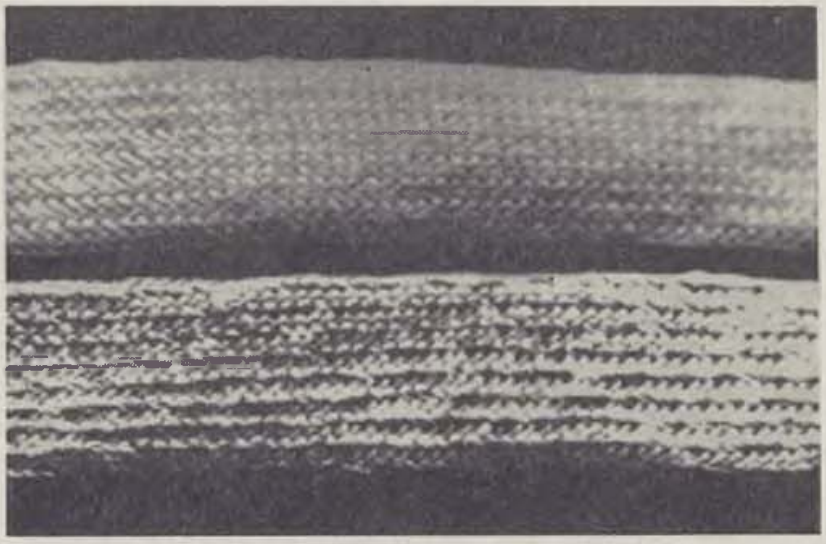

Fig. 1. Terylene (above) and Letilan-Lavsan (below) bands used as tendon prostheses

METHOD OF EXPERIMENT

The tendo Achillis of rabbits of Chinchilla stock weighing 1.6—2.0 kg. served as material. In the first and second series of experiments, the reaction of the tendon and the surrounding tissue to the presence of Terylene and Letilan-Lavsan implants** were studied. For this purpose, bands of Terylen and Letilan-Lavsan measuring 20×6 mm (Fig. 1) were sutured to the anterior aspect of the tendon.,

In the second part of the investigation (third and fourth series of experiments), the dynamics of functional restoration of the limb and regeneration of tissue were investigated in bridging of a defect in the tendon, measuring up to 12 mm. The length of the prosthesis corresponded to that of the excised part of tendon in all experiments, which avoided straining the muscle after operation (Fig. 2). The limb was immobilized by a plaster cast for three

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* Letilan is a Soviet polymer and was first produced in the Leningrad Textile Institute with the collaboration of the workers of the Institute of Organic Synthesis, Academy of Sciences of the Latvian Soviet Republic.

**Because Letilan fibres are not strong enough, a combination with Lavsan fibres (Lavsan 60 % and Letilan 40 %) was used.

weeks. The periods of observation in each experiment are registered in the table.

The site of implantation and histological examination of tissues was carried out at definite periods. The sections were stained with haematoxylin-eosin, azure-eosin, according to van Gison or Mislakovsky and with methyl green pyronine.

RESULTS OF EXPERIMENTS

Implantation: In the first series of experiments with implantation of a Terylene band, signs of inflammation were observed seven days after operation in the tissues surrounding the implant. Near the implant blood clots,

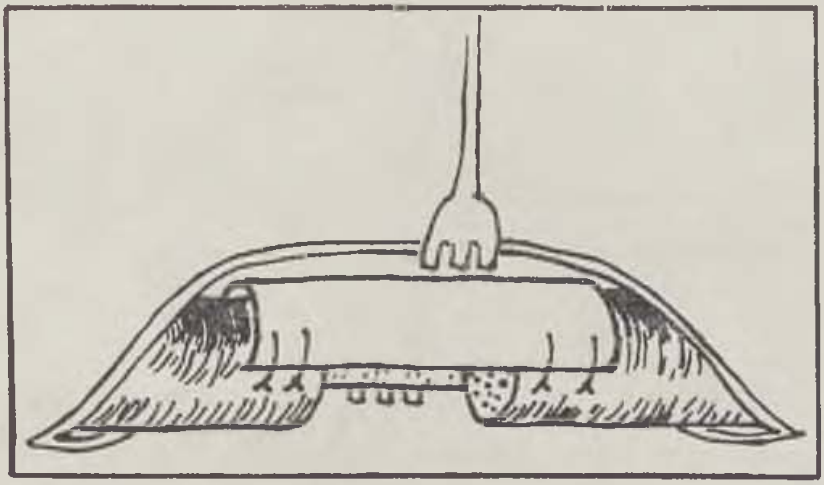

Fig. 2. Diagram of fitting a tendon with a prosthesis in the experiment

accumulations of macrophages and polynuclear leucocytes were found. At the end of the second week the alloplastic band was surrounded by young granulation tissue composed of macrophages, fibroblasts, polynuclear granulocytes and thin-walled vessels (Fig. 3).

Within the following days, the granulation tissue maturated. Thus, by the 21st day, the number of vessels in the tissue surrounding the implant had grown smaller. In the periphery of the band fibrous elements arranged along the tendon axis made their appearance. The granulation tissue invaded the band between the bundles of fibres and between the fibres of Terylene, giant foreign body cells were found. After four weeks a connective tissue capsule had formed around the band, which was composed of cellular and fibrillar layers.

Two months after operation, the number of cell rows of the inner capsule layer had been reduced to three or four. They were composed of fibroblasts and also contained giant foreign body cells (Fig. 4). Later, after six months, the layers of the capsule had grown thinner and showed no active cell reaction or any structural changes in the Terylene fibres.

In the second series of experiments where Letilan-Lavsan bands had been implanted, marked inflammatory reaction with a crowd of disintegrating leuco-

cytes was found near the band in the first seven days after operation. By the end of the third week, shallow foci of necrosis with giant cells were still detectable in the granulation tissue together with leucocyte infiltration (Fig. 5). In the following period, the granulation tissue gradually invaved between the fibres of the band, and the number of longitudinal fibrillar structures increased in the periphery of the implant. Starting with the fourth week after operation, single fibres of Letilan showed a change in stainability. By the second month, the cellular and fibrous layers of the capsule were all distinguishable. Even after six months, focal growth of granulation tissue chiefly near the Letilan fibres was observed. Changes in the Lavsan fibres were not found.

Table 1. Time of Observation in the Various Series of Experiments

Series of experiments	Number of observations	Time of observation (in days)					
		7	14	21	28	60	180
1. Implantation of Terylene band	11	2	2	2	2	2	1
2. Implantation of Letilan-Lavsan band	11	2	2	2	2	2	1
3. Bridging of tendon defect with Terylene band	24	4	4	5	5	3	3
4. Bridging of tendon defect with Letilan-Lavsan band	11	2	2	2	2	2	1
Total	57	10	10	11	11	9	6

FITTING OF ENDOPROSTHESIS

In tenoplasty using a Terylene band (third series of experiments), function of the limb was usually restored by the end of the sixth week. At certain periods, slight thickening of the tendon at the site of the implant was observed. Histological examination showed that two weeks after operation the defect in the tendon was bridged by granulation tissue where longitudinal fibrous differentiated structures were observed. By the end of the third week, the number of fibres had increased, the signs of inflammation had disappeared and the number of vessels decreased.

After one month, fibrous connective tissue had formed at the stump ends of the tendon. The orientation of fibres was sometimes upset in the region where they passed into the tendon (Fig. 6).

Later the number of fibres in the newly formed tissue continued to increase. The architecture of fibrils was identical with the structure of scar tissue at the site of the suture of the tendon six months after operation.

In the fourth series of experiments with fitting the tendon with a prosthesis using a Letilan-Lavsan band, the prosthesis tore off in five cases. Separation started in all cases with active loading of the limb (after removal of the plaster cast — by the fourth week). The process of tearing-off of the Letilan-Lavsan band proceeded slowly and was not accompanied by any marked inflammatory reaction.

In this series of the experiments, weight-bearing of the limb was not restored. Later a thin scar band could be palpated at the site of the eliminated prosthesis. Histological examination on the seventh day showed the defect in the tendon filled with blood clots containing a large number of leucocytes. Within two weeks focal necrosis of tissues near the prosthesis was observed in all cases, but after three weeks there were crowds of disintegrating leucocytes. Leucocyte infiltration surrounding the tissues persisted up to one month.

Where the prosthesis was eliminated (by the fourth to sixth week) epidermis had grown along the alloplastic band hand in glove with the inflammatory changes in the tissues. The structure of scar tissue connecting the tendon stumps after complete separation of the prosthesis resembled tendinous tissue at the latest periods of observation.

DISCUSSION

According to the results of experiments in series 1 and 2, the basic reaction of the tendon and the surrounding tissues to the implant was aseptic inflammation around the foreign body with formation of granulation tissue and subsequently of a connective-tissue capsule. However, the duration and intensity of inflammation as well as the cell composition of granulation tissue were different.

Thus, while the period of alterative-exsudative processes around the Terylene band lasted for seven to ten days, in implantation of a Letilan-Lavsan band it increased twice to three times and reached three to four weeks. The capsule of connective tissue around the Letilan-Lavsan band was better developed and active cellular reaction to the implant persisted throughout the period of observation.

These differences were obviously connected with the Letilan-Lavsan texture not being inert enough. The high stability of Lavsan, evidence of which has been furnished by many authors, permits to relate the above processes to the presence of Letilan fibres where nitrofurilacroleine is freed. The investigation of the dynamics of the aseptic inflammation in the second series of experiments permits to assume that the maximum concentration of nitrofurilacroleine near the alloplastic band is reached within the first three to four weeks after operation.

The "passivity" of the implant did not permit to solve the problem of suitability of Letilan-Lavsan bands for the use as tendon prosthesis. To a certain extent the answer to the question was given by the comparative appraisal of the results of series 3 and 4 of experiments.

These results have shown that during immobilization, when the tendon and prosthesis had not been exposed to any considerable stress, regeneration of tissues near the alloplastic band was analogous to that around implants. After removal of the plaster cast, weight-bearing of the prosthesis increased. This, obviously, was an additional irritating factor and together with the effect of nitrofurilacroleine it led to separation of the Letilan-Lavsan band.

These preliminary results have thus shown that Letilan-Lavsan did not meet the requirements made on a tendon prosthesis.

What part does the prosthesis play in restoration of function? According to the authors' opinion, the prosthesis does not only fulfill the function of a scaffold. The capsule forming around the alloplastic band is so thin that its significance in restoring function is rather doubtful. The results of the third series of experiments permit to conclude that the prosthesis has an influence on the course of the reparative processes chiefly by restoring the physiological tension in the muscles. This safely leads to formation of systematically arranged connective tissue between the tendon stumps. In other words, the prosthesis, in the same way as a ligature in tendon suture, mainly plays its part in fixation.

It is generally known that any experimental model cannot be applied undisputably to clinical conditions. In the given case it must be accounted for the indubitable difference in the processes of regeneration taking place in patients fitted with an endoprosthesis, the more so, since much larger defects in tendinous tissue must be bridged under clinical conditions. Apart from that, tenoplasty is often carried out in regions where the regenerative possibilities of tissues are less favourable as, for instance, within the tendon sheaths of the hand.

After critical evaluation of the given experimental results, alloplastic reconstruction was carried out in twelve disrupted flexor tendons of the hand using Lavsan prostheses. After 18 to 24 months the functional results were good in almost half the patients (5 out of 12).

CONCLUSIONS

1) In fitting a tendon with an endoprosthesis of Terylene, formation of systematically arranged scar tissue between the tendon stumps takes place in experiment, and function of the limb is fully restored in the experimental animals.

2) The duration and intensity of the alterative-exsudative processes in the tissues surrounding a Letilan-Lavsan band, does not, at present, permit to recommend this material for prostheses of tendon in patients.

3) The first clinical observations of tenoplasty using Lavsan prostheses have shown that it would be useful to elaborate the method to its perfection.

SUMMARY

The results of employing different synthetic material (Terylene and Letilan-Lavsan) for tenoplasty is dealt with in short. On the basis of an experimental study, the authors have arrived at the conclusion that polyester material, such as Terylene, is highly inert and is, therefore, suitable for endoprostheses of tendon. When using a Terylene band between the two tendon stumps systematically arranged scar tissue is formed which resembles tendinous tissue, and the function of the affected limb is fully restored. Letilan-Lavsan bands cannot be recommended for the purpose under clinical conditions, because it is not inert enough, provoking an intensive tissue reaction.

On the basis of the experimental results, the authors have used simple and combined prostheses made of polyester material for the reconstruction of twelve flexor tendons of the hand. The good results of these operations permitted them tc arrive at the conclusion that is was useful to further elaborate this method of plasty.

RÉSUMÉ

Endothèses des tendons

Tkatchenko S. S., Deduchkin V. S., Beloousov A. J.

On mentionne brièvement les faits concernant l'utilisation des différents matériaux synthétiques (Térylène et Letilan-Lavsan) pour l'aloplastie des tendons. Sur la base de leurs études expérimentales, les auteurs ont conclu que les matériaux de polyester (Térylène) sont d'une grande inertie et très convenables comme matériel pour les endothèses des tendons. Si l'on utilise une bande de Térylène, un tissu organisé et cicatrisé se forme entre les extrémités du tendon. Celui-ci ressemble au tissu du tendon et la fonction du membre se rétablit chez l'animal totalement. La bande de Latilan-Lavsan ne peut pas être recommandée pour l'utilisation clinique parce qu'elle est insuffisamment inerte et provoque une forte réaction des tissus.

Sur la base des résultats expérimentaux, les auteurs ont utilisé une prothèse simple et combinée préparée des tissus de polyester pour faire une reconstruction de 12 tendons des muscles fléchisseurs des doigts de la main. Les résultats positifs des opérations permettent la conclusion qu'il serait utile de continuer à élaborer cette méthode de la ténoplastie.

ZUSAMMENFASSUNG

Endoprothesen der Sehnen

Tkatschenko S. S., Deduschkin V. S., Belousov A. J.

Es wurden die Tatsachen betreffs der Anwendung verschiedener synthetischer Materiale (Terylen und Letilan-Lavsan) für die Aloplastik der Sehnen kurz angeführt. Auf Grund ihrer experimentellen Studien kamen die Autoren zur Schlussfolgerung, dass die Polyestermateriale hoch inert und als Material für Sehnendoprothesen geeignet sind. Bei der Anwendung eines Terylenbandes zwischen den Sehnenden bildet sich ein organisiertes Narbengewebe, dass dem Sehnengewebe ähnlich ist und es erneut sich vollständig die Fuktion der Gliedmasse beim Tier. Das Letilan-Lavsanband kann zur Anwendung in klinischen Bedingungen nicht empfohlen werden, da es unausreichend inert ist und starke Reaktion der Gewebe hervorruft.

Auf Grund ihrer experimentellen Ergebnisse benutzten die Autoren einfache und kombinierte Prothesen aus Polyestermaterialen zur Wiederherstellung von 12 Flexoren der Finger. Die positiven Ergebnisse der Operationen erlauben darauf zu schliessen, dass es zweckmässig wäre, diese Methode der Sehnenplastik weiter zu erarbeiten.

RESUMEN

Las endoprótesis de los tendones

Tkachenco S. S., Dedushkin V. S., Belousov A. J.

Están mencionadas en corto las realidades sobre el empleo de varios materiales sintéticos Terylen y Letilan-Lavsan para la aloplastia de los tendones. A base de sus estudios experimentales los autores han llegado a la conclusión de que los materiales

de polyester (Terylen) son sumamente inertes y convenientes como material para las endoprótesis de los tendones. Al emplear una cinta de terylen entre los cabos del tendón se forma un tejido ordenado cicatrizal que tiene semejanza con el tejido del tendón y la función de la extremidad en los animales se renueva plenamente. El empleo de la cinta Letilan-Lavsan no puede ser recomendada en condiciones clínicas porque no tiene inercia suficiente y provoca una reacción fuerte de los tejidos.

A base de sus resultados experimentales los autores emplearon una prótesis simple y combinada preparada de materiales de polyester para hacer una reconstrucción de 12 tendones de los flexores de los dedos de la mano. Los resultados positivos de las operaciones permiten concluir que sería útil seguir desarrollando éste método de tendoplastia.

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Prof. S. S. Tkachenko, Svetlanovsky Pr. 35/flat 116, 193223, Leningrad, USSR

The 4th Session of Plastic and Reconstructive Surgery within the Society for Surgery of the EGR, was held in Magdeburg from 9.—11. 5. 1974. Under the guidance of Doz. Dr. Pohl, Chairwoman of the Section, the following three complexes of themes were discussed:

1. Damage to the soft parts of the lower extremities
2. The polytraumatized hand
3. Structure — and reduction plasty of the mamma

These themes were supplemented by round table discussions. The colleagues from the CSSR contributed much to the success of the Session by their reports and many discussions. The Committee consists of the following members:

Chairwoman: Doz. Dr. Gertrud Pogl, 301 Magdeburg, Leipzigerstrasse 44 — Medizinische Akademie. — Deputy Chairman: Dr. Professor Herbert Wendt, 4502 Dessau, Auenweg 38. — Secretary: Dr. Uwe Müller, 301 Magdeburg, Leipzigerstr. 44 — Medizinische Akademie. Treasurer: Dr. Klaus Henkert, 114 Berlin, Ziegelstr. 34 — Unfallchirurgische Klinik.

In charge of the working team of hand surgery within the Section: Doz. Dr. Leni Büchter, 40 Halle/S, Leninallee 25 — Chirurgische Unfallsklinik.

The next Session is intended to be held at Magdeburg on 12.—14. 5. 1976. Skeleton themes: Methods of Operation in Plastic Surgery. Suture Material, Instruments. Hand Surgery, Sutures and Tendon Grafting. Skin Tumours. Esthetic Surgery and Legal Questions.

Bulgarian Medical Academy, Faculty of Medicine, Varna (Bulgaria), Chair of Surgery
Director Prof. P. Altankov, M.D.

THE ACADEMICIAN FRANTIŠEK BURIAN IN THE BALKAN WARS (1912—1913)

K. TROSHEV

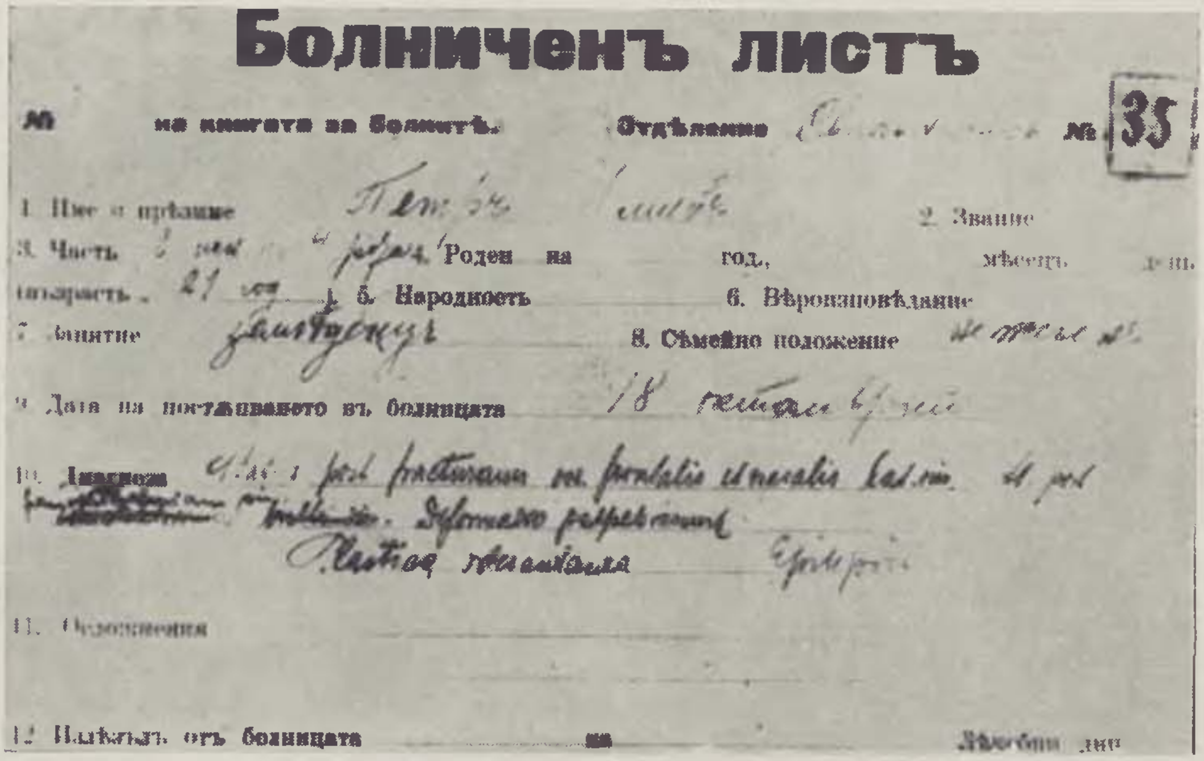
The Balkan Wars (1912—1913) aroused amongst the Slavs the feelings of brotherhood. Members of countries not participating in the wars, helped the fighting nations actively.

Upon the call of the Bulgarian Red Cross, the Club of Slavs in Prague responded readily (1). An auxiliary medical team headed by prof. Kukula was estblished and the organized help was second in its dimensions, directly after the Russian help. Completely equipped medical missions as well as individual doctors left for the Balkans and for Bulgaria.

Doctor František Burian leaves for Belgrade and Czerna Hora in October 1912 with the expedition of ass. prof. Tobiášek. Dr. Burian worked then as a junior physician at the Department of Surgery, headed by prof. Kukula (10). In Belgrade he worked as the assistant of ass. prof. Tobiášek and took active part in the general surgical work of the entire Mission. The young surgeon was apparently turning his attention to facial injuries, although in those days he did not yet treat them by special operative methods. His interest for facial injuries is proved by copies of case histories with various remarks and drawings by his own hand, from his maintained archives. They documentate the injuries excellently indeed (4).

On decision of the Auxiliary Team, Dr. Burian leaves for Sofia in January 1913. There he takes over from dr. Karel Štěpán, the charge of the Second Czech Mission at the Military Hospital (9). Later this Mission is also joined by his wife Dr. Anna Lankašová-Buriánová. The Mission is housed on the second floor of the Military School in Sofia, where it has 350—400 beds at its disposal.

Dr. Burian is doing all he can to obtain new furniture for the rooms used, in order to liquidate hospital infection. He introduces documentation as maintained at the Department in Prague and it is accurately being adhered to (14)! Burian often draws himself sketches to be attached to the case histories, in order to record details of the injury. The results of treatment of light and heavy injuries prove the good surgical erudition of the young physician. Dr. Burian is also concerned with interesting injuries to the skull and brain (7), vessels (8) a.o. In spite of the great working strain, here too


Болниченъ листъ

№ на книгата за болнитѣ. Отдѣление № 35

1. Име и презиме 2. Звание

3. Часть Роден на год., мѣсецъ день

4. Възрасть 5. Народность 6. Вѣроизповѣдание

7. Занятие 8. Семейно положение

9. Дата на постжпването въ болницата

10. Диагноза

11. Осложнения

12. Излѣзълъ отъ болницата на мѣсецъ ден

Fig. 1. Copies from the case history of Petr Iliev

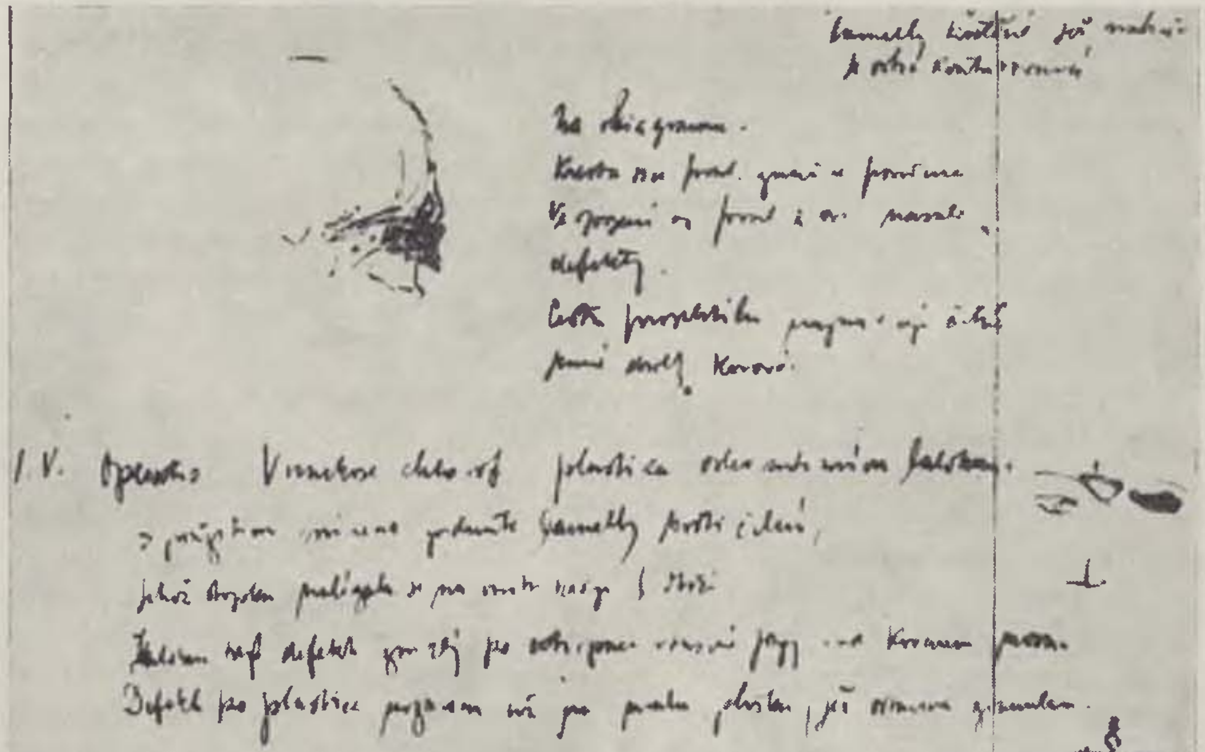


Fig. 2. Copies from the case history of Petr Iliev

his interest for injuries of the face and neck are evident. According to Report nr. 20 (2), Burian treated 2,7 % (25 patients) of all the patients, for facial injuries (nose 2, sinuses 1, upper jaw 2, lower jaw 9, soft tissues 4, ear 1, facial bones 1, neck 4). Although the facts and sources which we found are few, it is possible to draw conclusions from them, on the therapeutic methods applied. In the therapy of patients with injuries to the face and neck, then admitted to the various military hospitals, conservative methods predominated. In spite of this general tendency, Burian shows considerable surgical activity. Incisions and extractions of projectiles (bullet, splinter of a grenade, etc.)

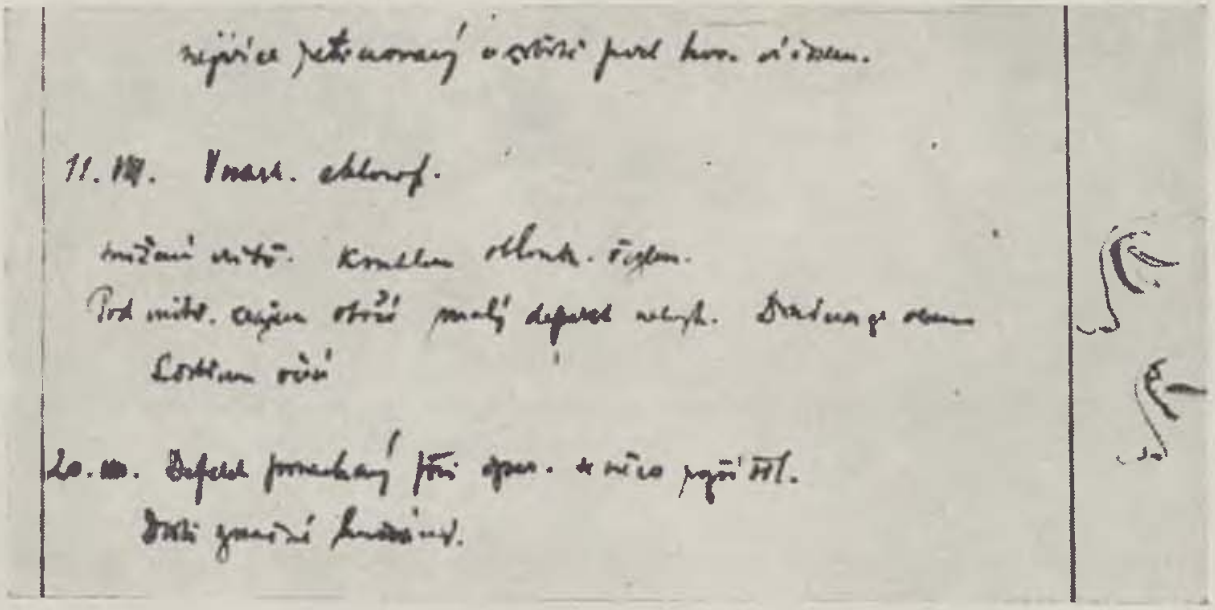


Fig. 3. Copies from the case history of Petr Iliev

are the most frequent to be carried out by him. Injuries to the sinuses require trepanation, frequent injuries to the lower jaw demand suture of the fragments. A considerable part of the patients required operation for osteomyelitis of the affected bones.

One can not fail to notice the extraordinary interest and the surgical skill on part of the young surgeon in the treatment of facial injuries. For the first time is Burian intentionally interested in reconstructive operations. Already he is drawn towards the face as not only being a highly functional and organized area, but also an area which carries great esthetic responsibility.

When taking over the Department, Burian found a soldier aged twenty one, named Petr Iliev (single, living at the village of Sušice near Horní Orechovice in the Region of Trnow). He was injured at the Battle of Lozengrad and under treatment at the hospital for two months. The following accurate diagnosis was entered into the case history by Dr. Burian's own hand: Status post fracturam oss. frontalis et nasalis lat. sin. St. post panophthalmism sin. Deformatio palpebrarum. Plastica osteocutea. Epilepsis. According to the description and the sketch, the defect was covered by a pedicle flap of bone and skin from the forehead (Fig. 1, 2, 3, 4). This has been probably the first plasty

Fig. 4. The bandaged Bulgarian soldier Petr Iliev in the second row. — Anna Lankašová-Buriánová, M.D., behind him the third row. — František Burian, M.D., behind her in the fourth row

carried out by academician Burian. He wrote himself: "... I started my first larger plastic operations in the time of the Balkan Wars" (10). Elsewhere he adds that he had "... then opportunity to carry out plastic operations of the face and to cover large skin defects". Due to the immense amount of other work, these were, of course, only isolated performances (10). Concurrently Burian writes at several occasions: "...practically all the wounds are decayed, everything here decays terribly ... only fistules, sequesters. We practically do not see any clean wounds" (5, 6).

Under such conditions, plastic operations are courageous undertakings, incuring great risks. Besides isolated cases of local plasty, even free skin grafts were frequently carried out (2, 10, 11). In the report to Dr. Kasogledov (2) with whom Burian co-operated, it is being stressed that "skin plasty is frequently undertaken". The method of Roux was applied.

When describing the surgical activity of Dr. Burian during the time of the Balkan Wars, we must not overlook also his — at that time perhaps to a certain extent still subconscious — endeavour to obtain support for therapy "in the sense of normal function" as demanded by physiologic military surgery according to Klapp (12) in case of war injuries. I should like to turn attention to this fact, because I assume that his first thoughts on writing the monograph "Physiologic operating" published by Burian in 1945, were also formed at the time of his activity in Bulgaria, although the immediate reason for writting, arose much later (10).

The described operations and the search for the most rational method of treating war injuries, were really unique at the time and they were, however, the first operations by Burian which paved the way for his later development in the specialised branch of surgery. The mentioned facts afford the assumption that the great plastic surgeon, the founder of the Prague school of plastic surgery, academician František Burian, made his first steps in plastic surgery at the time of the Balkan Wars in the years 1912—1913. H. S.

SUMMARY

On basis of authentic material from the archives, the author not only describes the entire activity of Dr. Burian in Sofia at the time of the Balkan Wars in 1912—1913, but also the plastic operations carried out by him. The author demonstrates that academician Burian carried out his first plastic operation in Sofia and that it was there also that first idea on the later written monograph "Physiologic operating" took form.

RÉSUMÉ

František Burian, membre de l'Académie, pendant les guerres aux Balkans en 1912—1913

Trochev K.

L'auteur décrit, sur la base des matériaux autentiques d'archives, non seulement toute l'activité de docteur Burian à Sophie pendant les guerres aux Balkans en 1912—1913, mais aussi les opérations plastiques réalisées par celui-ci. L'auteur suppose que professeur Burian ait réalisé ses premières opérations plastiques à Sophie et que c'était là où première idée de sa monographie «Opérations physiologiques» écrite plus tard ait pris son origine.

ZUSAMMENFASSUNG

Akademiker František Burian in den Balkankriegen 1912—1913

Troschew K.

An Hand authentischer Archivmaterialien beschreibt der Autor nicht nur die gesamte Tätigkeit Dr. Burians in Sofia in der Zeit der Balkankriege 1912—1913, sondern auch die von ihm durchgeführten plastischen Operationen. Der Autor nimmt an, dass Akademiker Burian seine ersten plastischen Operationen in Sofia durchgeführt hat und dass auch dort seine erste Idee zu den später geschriebenen Monographie „Physiologisches Operieren" entstanden ist.

RESUMEN

El académico František Burian en los tiempos de las guerras balcánicas

Troshev K.

A base de materiales auténticos de archivo el autor describe no solamente toda la actividad del doctor Burian en Sofia durante las guerras balcánicas en 1912—1913, sino también las operaciones plásticas ejecutadas por el mismo. El autor supone que el académico Burian haya realizado sus primeras operaciones plásticas en Sofia a que haya sido allí donde nació su primera idea para la más tarde escrita monografia „Intervenciones fisiológicas".

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A Section of Plastic and Reconstructive Surgery has been established within the Union of Societies of Medical Sciences in Roumania, in November 1973, with the following Committee: President: Professor Agrippa Ionesco. Members: Professor Valerian Popesco, Dr. Aurel Vasiliu, Professor Petre Firu, Secretary: Dr. Stefan Milicesco.

IN MEMORIAM

Prof. Dr. Gustavo Sanvenero-Rosselli died suddenly at the age of 77. He was a sincere friend of our deceased teacher Prof. F. Burian and of all Czechoslovakia, which do had visited several times. Prof Sanvenero-Rosselli became interested in surgery already as a student of medicine in World War I in which he participated in the years 1915—1919. After surgical practice he became fully dedicated to the newly

Prof. G. Sanvenero-Rosselli unveiling the bust of Prof. Dr. F. Burian in Prague in 1967

starting branch of plastic and reconstructive surgery. He studied under F. Lemaitre in Paris where he also met E. Sheehan, Feris Smith, H. Gillies, V. Veau a. o. In 1929 he took over in Milan the Institute "Padiglione per i Mutilati del Viso" (Department for Face Injuries) where — on 25 beds — he operated on persons with war — and civil deformations of the face, facial tumours and with special interest, congenital facial defects, chiefly clefts. He deepened his education under Lexner in Munich, Joseph in Berlin, Gillies in London, Sheehan and Kazanjan in the USA. In 1931 he became a member of the editorial board of the first European journal of plastic surgery: "Revue de Chirurgie Plastique", published by M. Coels and also a member of the newly

founded European Society of Plastic Surgery. He participated in the organisation of the Congress at Brussels and also at Paris (1936 and 1938). Here he also met F. Burian as well as Ragnel, Kilner, Cookley, Fogh Andersen, Limberg. In 1939 he published in Italy the first number of the journal "Plastica Chirurgica". But the journal perished after three numbers, because the printing-office was bombarded out and all material was destroyed. In World War II, Prof. Sanvenero-Rosselli worked in the "Centro Mutilati" (Centre for Injured) which was moved during bombardment to Lecco (Como lake) where he went daily, often even walking many miles, in order to operate on injured soldiers.

After the war he continues to be dedicated at the Padiglione per i Mutilati del Viso, to peaceful reconstructive surgery and treats at the Institute chiefly congenital facial defects and deformities. His endeavour for the development and acknowledgement of the branch of plastic surgery was crowned by success and in 1962 the branch is being officially recognized in Italy. Prof. Sanvenero-Rosselli obtains the first Chair of Plastic Surgery in Turin and in 1963 at the University of Milan. There he worked with great partiality and most dilligently up to his age of 75 years and just before his sudden death he was preparing for a lecture tour of the USA on invitation of M. Convers.

Prof. G. Sanvenero-Rosselli was known by the plastic surgeons practically all over the world. Being an excellent and vivacious orator, he took part in Congresses in many countries with beautiful, carefully documentated lectures, he was the President of the World Congress of Plastic Surgery in Rome in 1967 and he was repeatedly honorary chairman of Congresses held by the French Society of Plastic Surgery. For his merits for plastic surgery, he was nominated member of many foreign specialized societies, in 1950 he became an honorary doctor of the University of Buenos Aires.

Prof. Sanvenero-Rosselli published more than 100 papers in many journals at home and abroad and wrote many chapters into books. In 1936 he displayed in Copenhagen a film on the operation of the cleft palate using a pharyngeal flap. In 1971 he displayed in Prague a wonderful film on the function of the palate and at that occasion we remembered that the late Prof. Burian had been born just 90 years before.

Prof. Sanvenero-Rosselli was not only an outstanding specialist but also a rare, immensely educated person with beautiful and hoble interests. He loved all that was beautiful and become therefore also a sincere admirer of the beauty spots of ancient Prague where we had several times the opportunity of welcoming him and we shall never forget him.

Prof. H. Pešková, M.D., DrSc.,
Department of Plastic Surgery, Prague

M. Brozman

REVASCULARIZATION OF FREE SKIN GRAFT IN DEPENDENCE ON THE RECIPIENT BED

Fig. 1. Transplant 24 hours after implantation into bed with granulation tissue removed. Clarified in glycerine

Fig. 2. Section through recipient bed and transplant 24 hours after implantation into bed with granulation tissue left intact

Fig. 3. Section through bed and transplant 24 hours after implantation into bed with granulation tissue removed

Fig. 4. Detail of recipient bed and transplant 24 hours after implantation into bed with granulation tissue removed

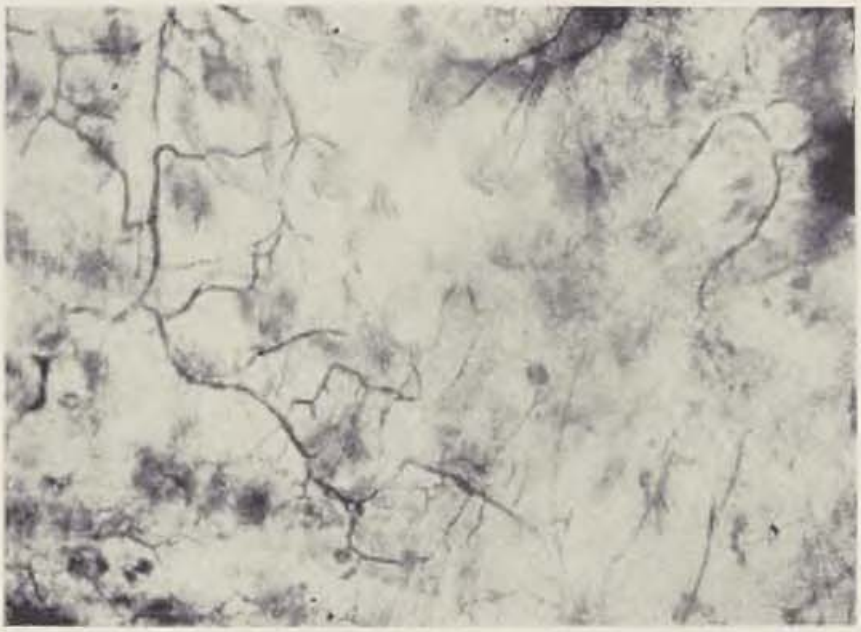

Fig. 5. Transplant 48 hours after implantation into bed with granulation tissue left intact

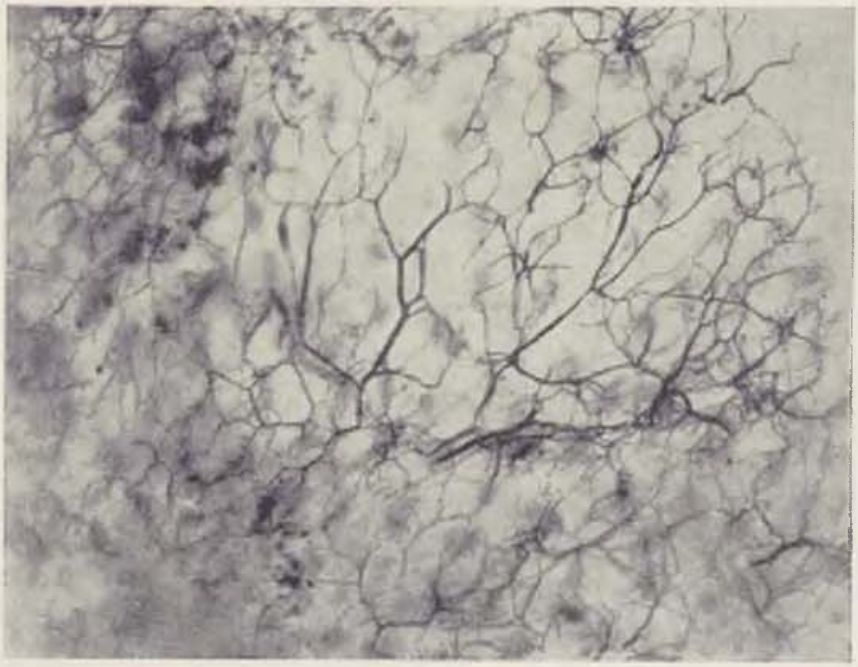

Fig. 6. Transplant 48 hours after implantation into bed with granulation tissue removed. Clarified in glycerine

Fig. 7. Section through bed and transplant 48 hours after implantation into bed with granulation tissue left intact

Fig. 8. Section through bed and transplant 48 hours after implantation into bed with granulation tissue left intact

Fig. 9. Detail of vascular link-up between bed and transplant 48 hours after implantation into bed with granulation tissue removed

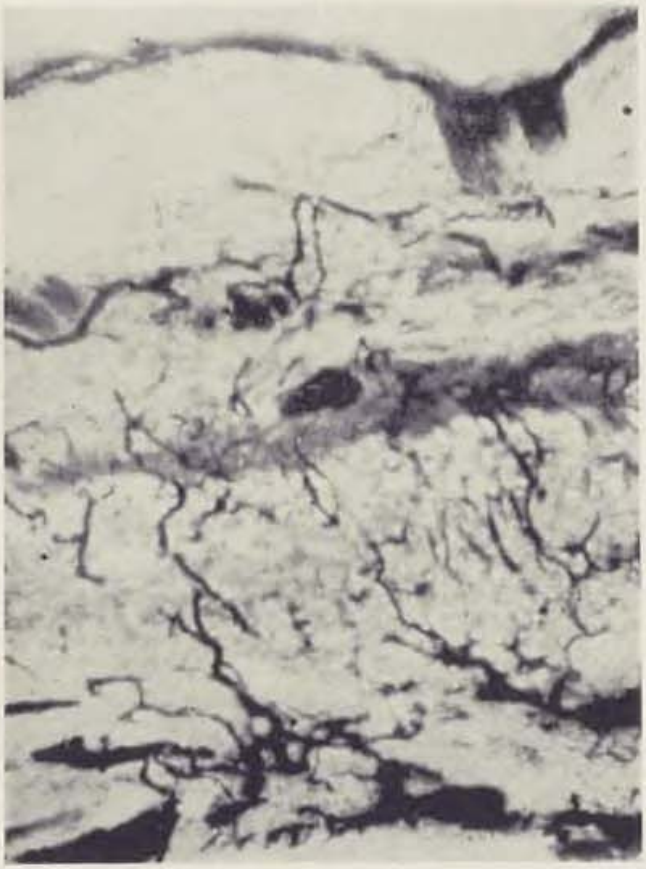

Fig. 10. Section through bed and transplant 72 hours after implantation into bed with granulation tissue left intact. On border between bed and transplant a bright strip of fibrin network can be seen

Fig. 11. Transplant 72 hours after implantation into bed with granulation tissue removed. Clarified in glycerine

Fig. 12. Section through bed and transplant 72 hours after implantation into bed with granulation tissue removed

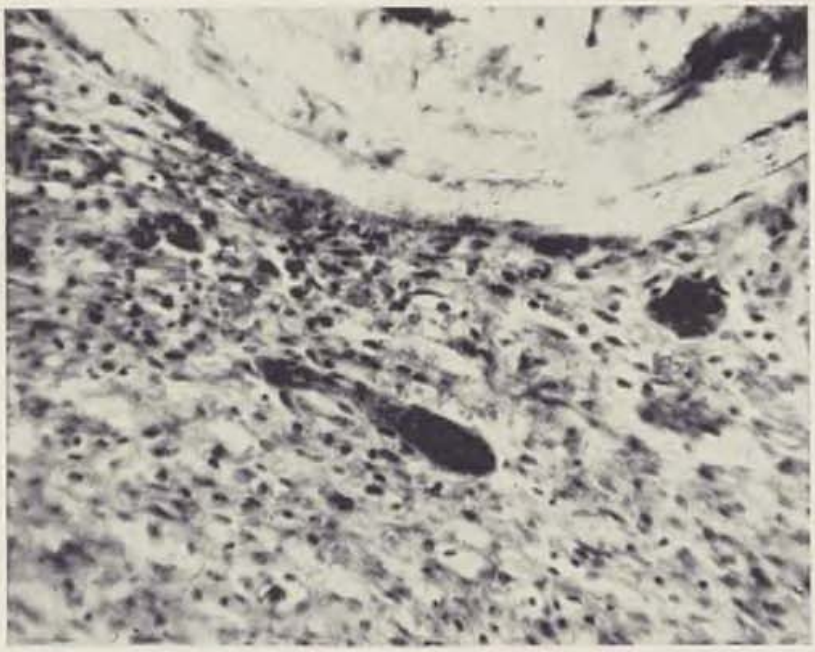

Fig. 3. Implantation of Terylene band, two weeks after operation, rabbit No 3. Near the Terylene fibres granulation tissue composed of fibroblasts, macrophages, thin-walled vessels and single polynuclear leucocytes has developed. Stained with haematoxylin-ecsin, magnified: objective 40, ocular 7

Fig. 4. Implantation of Terylene band, two weeks after operation, rabbit No 9. Around the implant a connective tissue capsule composed of an inner layer of three to four rows of cells and an outer layer of collagenous fibres have developed. Stained with haematoxylin-eosin, magnified: objective 40, ocular 7

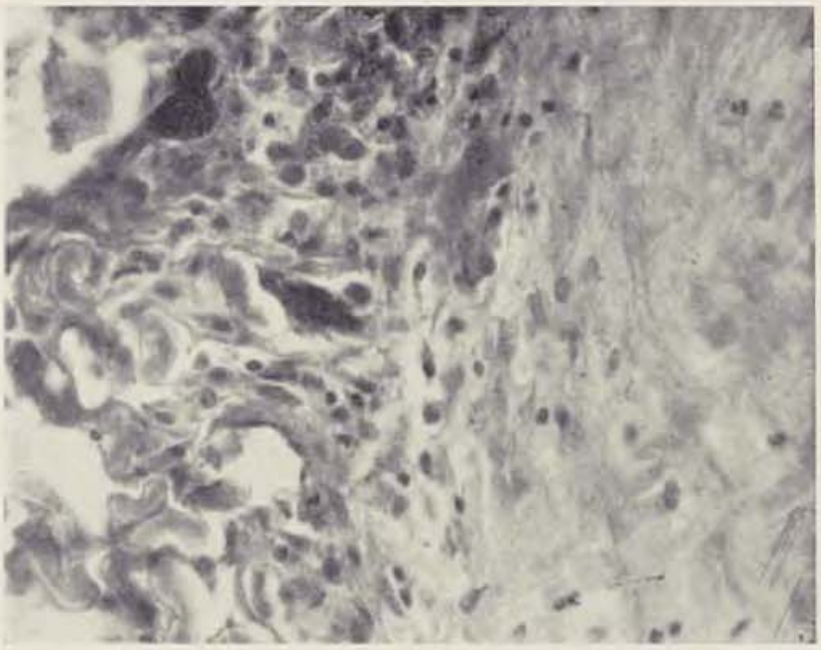

Fig. 5. Implantation of Letilan-Lavsan band, three weeks after operation, rabbit No 18. Granulation tissue composed of microphages, fibroblasts, polynuclear leucocytes and other polynuclear cells, invading between the Letilan fibres. Stained with haematoxylin-eosin, magnified: objective 40, ocular 10

Fig. 6. Tendon fitted with Terylene endoprosthesis, four weeks after operation, rabbit No 7. Transition from tendon (1) into fibrous connective tissue whose fibres are longitudinally arranged (2). Stained according to van Gison, magnified: objective 3, ocular 10

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