ACTA CHIRURGIAE PLASTICAE

INTERNATIONAL JOURNAL
OF PLASTIC SURGERY

17 · 1-2

1975

CS ISSN – 0001 – 5423

AVICENUM - CZECHOSLOVAK MEDICAL PRESS
PRAGUE

Exclusive Distributors for all Western Countries
KARGER-LIBRI AG, Petersgraben 31, CH-4000 Basel 11 (Switzerland)

Published four times (in 1959: two times) a year by Avicenum - Czechoslovak Medical Press, Malostranské nám. 28, Praha 1. Editor in Chief Prof. H. Pešková, M. D.; Deputy of Editor in Chief Prof. V. Karfík, M. D. — Address of the Editorial Office: Acta Chirurgiae Plasticae, 120 00 Praha 2, Legerova 63, Czechoslovakia. — Press: Středočeské tiskárny, n. p., provoz 01, Hálkova 2, Praha 2

Subscription rate: sFr 50.— plus postage. Exclusive distributors for all countries with the exception of Albania, Bulgaria, China, Cuba, Czechoslovakia, German Democratic Republic, Hungary, North Korea, North Vietnam, Mongolia, Poland, Rumania, Union of Soviet Socialist Republics and Yugoslavia:

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AVICENUM, CZECHOSLOVAK MEDICAL PRESS, PRAHA, CZECHOSLOVAKIA

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Thirty Years of Liberated Czechoslovakia

The thirtieth anniversary of Liberation, which the Czechoslovak Socialist Republic is celebrating, has a greater significance than that of the mere recollection of a historical event which preserved the existence of the Czech nation. The coincidence in date with that of Himmler's infamous plan of 1942 which counted upon the final solution of the Slav question in Central Europe within thirty years, is by no means without importance. It was the liberation of Czechoslovakia by the Red Army which prevented the destruction, the forced emigration to the shores of the Arctic or at the very least the Germanization [illegible] Slavonic inhabitants of Central Europe. The anniversary of Liberation [illegible] offer not only an occasion which brings to the mind of the younger generation, lacking personal experience of the Liberation, the events of the past, rendering vivid to them the heady atmosphere of freedom, of gratitude for the preservation of existence: it also serves to recall the true meaning of the occurrence.

For this cannot be adequately interpreted by mere historic reminiscence. The anniversary of Liberation for a community which, thanks to the defeat of fascism had its very existence preserved, is at the same time a confrontation, and that not only, as might be thought at first sight, a confrontation with the brutality of fascism, but also a confrontation of programmes and projects for a new life. It is no mere chance that the elements of the new programmes carried out after May 9th 1945 have their beginnings even earlier than the moment when the Red Army and the Allied Forces were crushing the might of German fascism. It is characteristic that the elements of the programme for a new life originated at the very beginnings of the anti-fascist resistance, that they arose from mass campaigns organized as early as 1938 and in particular in 1939 and were developed into a remarkably integrated refusal of the situation which led to the Munich of 1938, within the ranks of progressive young people in the organization "Předvoj" (Vanguard). The symbolic handing on of the torch can be seen too in the fact that the great majority of the members of this organization did not live to see the Liberation.

The political programme which arose from this confrontation and which was put into practice after the Liberation, is the work of several generation:

the mighty struggle against fascism gave a new dimension to the earliest projects.

For the whole of society, but in particular for the generation which came to maturity and sought for its aim in life in the midst of the fight against fascism, the Liberation meant a confrontation all the simpler because of the clear distinction of light and shade, a confrontation of all the wider range because of their own share in the victory. The dialectical relationship of beginning and end renders the Liberation one of the most striking milestones in the history of modern Czechoslovakia.

The end of the Nazi occupation, of the brutal despotism of fascism and even of the threat of genocide, provided the conditions for a new life based on the experience not of mere observers, but of the direct participants in the struggle. It was precisely this struggle which influenced the nature and the aim of society so intensely that every political force which sought to avoid destruction at the hands of an irate people had to count upon this quality. The basic starting point of the Liberation as a complex of political events and tendencies is also the basis on which the balance of thirty years of work in freedom can be struck, the balance of thirty years of social development, which not only implemented the programme of national and democratic revolution as it had been formulated at the end of the War, but also, with the support of the vast majority of citizens, carried out according to plan the basic socialist changes. All who acquaint themselves with the fundamental documents will realize that it was no chance programme, nor one which acted automatically.

The real value created by the unification of the positive political trends, multiplied by the stress laid on the social needs, whose satisfaction was to ensure that the year 1938 could never be repeated, developed into a true mass political activity, which thus became not only the expression of gratitude for Liberation, but also a force which under leadership of the Communist Party of Czechoslovakia put into practice daring plans. The new political climate permitted the maximum application of practical political experience in expanding the struggle which determined the uncompromising orientation of development in the liberated state towards socialism.

It was a direction for which adequate examples were too often lacking. It brought with it highly positive results, though at the cost of no few sacrifices.

The Editors

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Department of Plastic Surgery,
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XERODERMA PIGMENTOSUM

V. KUBÁČEK

INTRODUCTION

Xeroderma pigmentosum is a relatively rare, recessively inheritable disease, first described by Kaposi in 1870. It is characterized by oversensitivity to light, the formation of numerous pigmentations, particularly on the exposed parts of the body, atrophy, telangiectases, sometimes even psychic changes and in the end by malignant changes of various types. The disease frequently leads to death from secondaries in internal organs. Dermatologists register this disease among the so-called photodermatoses. It starts at an early age with a single inflammatory stage which does not recur in the later years and passes into the stage of hyperpigmentation. The beginning of the disease without an inflammatory stage is rare. In the further course the stage of whitish, cicatrized spots develops. Their surfaces are smooth and glossy, the skin is thinned, atrophic and sometimes taut which leads to the development of ectropia and secondary conjunctivitis, if the surroundings of the eye are affected. At this stage telangiectases also develop at the sites of atrophic foci forming red spots. All these changes chiefly develop on sites exposed to the sun and wind and are most conspicuous in the face and on the dorsum manus so that the patients acquire a senile appearance. They complain of dryness of and tension in the skin.

After these changes and sometimes even during them, hyperkeratoses and verrucae appear. They become covered with a layer of horn which is sometimes considerable, resembling corns. These horny layers are usually spontaneously eliminated and under them superficial ulcerations are found, resembling a basal cell carcinoma. Summation of the influence of the atrophic changes leads to narrowing of nostrils and the mouth, and at the stage of hyperkeratosis, the disease passes into the stage of malignant proliferations which are capable of disrupting soft tissue, particularly in the face, down to the periosteum. In extensive changes which have lasted for a long time, secondaries develop in lymph nodes, the spleen, the peritoneum and the base of the skull. At this stage the disease terminates with cachexia and death. The prognosis is the worse the earlier it started. If it starts at a later age, its course is milder and the tumours also have a more benign character.

Fig. 1

Fig. 2

Fig. 3

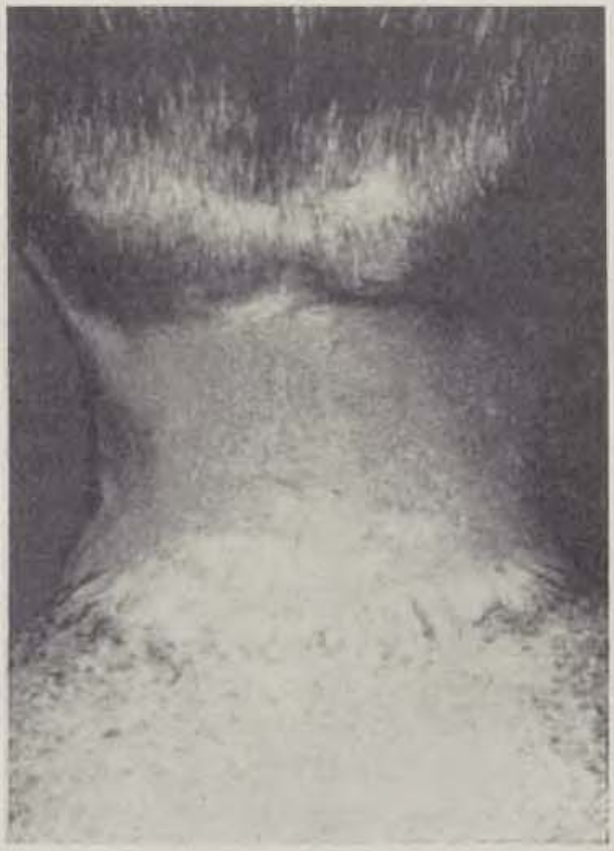

Fig. 4

The occurrence of xeroderma pigmentosum in coloured rases bears witness to the fact that this is not a simple oversensitivity to light and that congenital metabolic disorders participate in its development, perhaps accompanied by the formation of photodynamically active substances.

Dermatologists mostly treat the disease conservatively with antimalarials and recommend vitamins (A, B-complex, PP, B12, C and D), but also prescribe

Fig. 5

Fig. 6

corticoids. Certain good results have been achieved with cytostatics, particularly ethylaniminocholine with the use of which it was possible to prevent the development of new tumours, but further growth of already existing tumours could not be halted. In some cases, actinotherapy has also been recommended. However preferences is given to radical surgical treatment of malignant tumours.

THE AUTHOR'S OWN EXPERIENCE

At the author's Department there was opportunity of treating a total of two patients with this disease. One came at a late stage of the fully developed disorder with severe general changes and after long conservative treatment, including actinotherapy, and with marked psychic changes, disorders in speech

Fig. 7

Fig. 8

and gait and with reflex anomalies and debility. In this patient treatment was limited to palliative excision of tumours in the face and hands. Radical surgery had no hope of success because of the advanced stage of the disease.

The other patient was admitted to the Department in Feb., 1963, as a transfer from the Dermatological Department of Prof. Horáček, i.e. eleven years ago.

This was a seven-year old boy in whom the disease had already fully developed (in the face, i.e. on the left lower eyelid, on the left cheek and the upper lip malignant tumours had developed which were later diagnosted by the histologist as spinocellular carcinoma, (Fig. 1) but his general condition was not affected to any degree. The child was very intelligent, patient and willing to co-operate.

Fig. 9

When considering the question as to the surgical condition of this unhappy child and how to help him, it was decided to replace most of the affected skin by "healthy skin" from sites which hitherto had not shown any signs of the disease, i.e. from the abdomen and the thorax the skin of which had been covered by garment for most of the year.

In this way the entire skin of the face, the back of the neck and the backs of both hands was replaced. In the course of treatment which lasted over several years, three times recurrence of the tumour was observed on the upper lip and the columella of the nose. This had to be treated by radical excision of the central part of the upper lip and the nose, and both these parts had to be reconstructed using skin flaps from the hypogastrium (Figs. 2, 3 and 4).

The transplanted skin, although it also was exposed to external influence, did never show any signs of the disease during the following three years. Only then did minute pigmentations without hyperkeratosis start to appear, which have persisted on the transplants to a larger or lesser degree up to the present days, i.e. for eleven years. No tumourous proliferation has ever appeared on the transplanted skin (Fig. 5).

DISCUSSION

Jacobi was of the opinion that transplanted skin is not as oversensitive as original skin affected by the disease. It seems that this can be confirmed.

However, the author does not believe that transplantation is a causal treatment of the disease, because the transplanted skin again succumbs to the same

Fig. 10

typical changes of the disease. They, are, however, much milder and, as can be noticed after eleven years of observation of the second patient, do not show any malignant character (Fig. 5).

In order to confirm that transplantation by itself plays a certain part in the sense that it mitigates the manifestations of the disease, the author transplanted affected skin onto the abdomen, where it was saved from exposure, and onto the forearm, where it was allowed to be exposed to external influences. Both these transplants took well and lost the characteristical signs of the disease on both sites (Figs. 6, 7, 8 and 9).

The incorporation of dieased skin from the dorsum of the right hand and implanted into the left side of the hypogastrium proved interesting. The skin which had distinctly shown the signs of the disease, first developed a thick horny scale, yet under it the skin has not shown any sign of the disease up to the present day (Figs. 10 and 11).

The author assumes, therefore, that these transplantations have furnished evidence that transplantation itself has brought about partial recovery of the skin, although he does not even venture to offer any explanation of this phenomenon.

CONCLUSION

It should be emphasized that radical excision of diseased skin in xeroderma pigmentosum followed by transplantation of skin taken from covered

parts of the body is apt to bring about certain results and an improvement in the patients' fate.

The author's eleven-year experience with one of two patients treated in whom the disease started to develop at an early age and a spinocellular carcinoma on the lower eyelid was already found at the age of seven, i.e. the disease was fully developed, justifies his conviction. In this patient the

Fig. 11

disease has not shown any deterioration, on the contrary, the patient's condition has improved, no new carcinomatous tumours have appeared and secondaries have never been found. B. K.

SUMMARY

The report deals with the experience with surgical treatment of a relatively rare, recessively inheritable disease, xeroderma pigmentosum, in two patients. The author expresses his opinion that replacement of diseased skin with free transplants of skin taken from parts which are unaffected by the disease (i. e. sites covered by garments), brings about a certain improvement in the fate of such patients, although the treatment is not a causal one.

The unaffected skin undergoes certain typical changes after a long period, but these changes are much milder.

Experimental transplantation of affected skin from sites exposed to external influences has shown that transplantation of diseased skin brings about a certain "recovery" of it. No matter whether the skin implanted to a covered site (hypogastrium) or a site exposed to external influences (forearm), it lost the typical signs of the disease after transplantation.

It seems, therefore, that Jacobi was right in maintaining that the transplanted skin was less oversensitive to external influences.

RÉSUMÉ

Xeroderma pigmentosum

V. Kubáček

Le travail renseigne sur les expériences avec le traitement chirurgical d'une maladie relativement rare, héréditaire du caractère récessif — xeroderma pigmentosum — chez 2 malades. L'auteur proclame que le remplacement de la peau atteinte par une greffe libre prise des parties du corps qui ne sont pas attaquées par la maladie en question (ce sont les parties cachées sous les vêtements) emporte une certaine amélioration du sort des personnes grièvement malades, quoiqu'il ne soit pas un traitement étiologique.

Il est vrai que la peau transmise qui n'était pas atteinte, elle aussi, après une certaine période, subit des modifications typiques qui sont caractéristiques pour cette maladie, mais celle-ci sont considérablement modérées.

L'expérience avec le remplacement de la peau atteine prise des parties exposées aux influences extérieures démontre que la transplantation de la peau malade provoque une sorte de «rétablissement».

C'était non seulement en cas de remplacement de la peau dans une partie recouverte (hypochondre), mais aussi dans celle qui est exposée aux influences extérieures (avantbras) où elle avait perdu les signes particuliers de la maladie.

Alors, il semble que Jacobi avait raison en affirment que la peau transmise était moins sensible aux influences extérieures.

ZUSAMMENFASSUNG

Xeroderma pigmentosum

V. Kubáček

Die Arbeit berichtet über Erfahrungen mit der chirurgischen Behandlung der verhältnismässig seltenen, rezessiv vorkommenden Erkrankung mit Xeroderma pigmentosum bei zwei Kranken. Es wird die Ansicht ausgesprochen, dass der Ersatz der kranken Haut mit einem freien Hauttransplantat von Stellen, die von der Krankheit nicht befallen sind (d. h. von durch Kleidung nicht gedeckten Stellen) eine gewisse Besserung des Schicksals dieser schwer kranken Patienten bringt, obwohl er keine kausale Lösung darstellt.

Die unbetroffene übertragene Haut unterliegt zwar nach einer bestimmten längeren Zeit ebenfalls typischen Veränderungen, die für die Erkrankung charakteristisch sind, diese Veränderungen sind jedoch wesentlich leichter.

Experimentelle Übertragung der befallenen Haut von Stellen, die äusseren Einflüssen ausgestellt sind, zeigt, dass die Transplantation der erkrankten Haut eine Art ihrer „Genesung" bewirkt.

Gleich ob die Haut an eine gedeckte (Unterleib) oder an eine den äusseren Einflüssen ausgestellte (Unterarm) übertragen wurde, nach der Zuheilung verlor sie die typischen Erkrankungsmerkmale.

Es scheint also Jacibo recht gehabt zu haben, wenn er behauptete, dass die transplantierte Haut gegenüber den äusseren Einflüssen weniger überempfindlich ist.

RESUMEN

Xeroderma pigmentosum

V. Kubáček

En este trabajo setán comunicadas las experiencias con tratamiento quirúgico de la enfermed relativamente rara, de carácter recesivo — xeroderma pigmentosum, en 2 pacientes. Fue expresada la opinión de que un reemplazo de la piel enferma por un transplante libre de la piel tomado de los lugares que no están afectados por la enfermedad (es decir de los lugares cubiertos de ropa) lleva una cierta mejora de la suerte de estas personas tan gravamente enfermas, si bien no sea solución etiológica.

Es verdad que la piel trasladada no afectada sucumbe también a los cambios típicos que son característicos para esta enfermedad después de haber pasado un período de cierta longitud, pero estos cambios son considerablemente más moderados.

Experiencia con la trasladación de la piel afecta tomada de los lugares expuestos a los influjos externos demuestra que la trasplantación de la piel enferma provoca un cierto restablecimiento de la misma.

Si bien la piel había sido trasladada a un lugar protegido (región hipogástrica) o a un lugar expuesto a los influjos externos (el antebrazo) perdió después de la toma los signos característicos para esta enfermedad.

Parece pues que Jacobi tenía razón en afirmar que la piel trasplantada era menos sensible a los influjos externos.

REFERENCES

Bielický, T.: Photodermatoses (in Czech), SZdN, 1963, p. 151—160.

Berlin, C., Tager, A.: Arch. Derm. (Chicago) 85—81, 1962.

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ON THE ROLE OF BIOLOGICAL PREPARATION OF RECIPIENT BED IN FREE TRANSPLANTATION OF BONE

ALLA A. LIMBERG, V. V. NEKACHALOV

A good take of free bone grafts is possible when they are implanted into an aseptic bed made up of viable tissues well supplied with blood. If scar tissue is present in the bed or if there is a danger of infection, the surgeon may have to chose between abstaining from free transplantation or find a way of specially preparing the transplant and the tissues of the bed. Among the many various methods of stimulating bone graft incorporation, special interest deserves the method of "biological" preparation of the graft and the recipient bed.

Biological preparation of a bone graft prior to its free transplantation was first employed between 1920 and 1930 in plastic operations on the mandible in the presence of a communication between the recipient bed and the oral cavity and also in the treatment of pseudoarthrosis of long tube-shaped bones. Good take of free bone grafts in a cicatrized or infected bed was observed, when the grafts were preliminarily implanted into subcutaneous tissue or left in the donor wound after excision (Imbert et Real, 1917; Brooks et Hudson, 1920; Limberg, 1926; Axhausen, 1928; Key, 1937). The theoretical foundation and the term "biological preparation of the graft" were suggested by Limberg in 1942. He and his collaborators studied the changes taking place in biological preparation of bone grafts. They consist in the features of aseptic inflammation, necrosis and focal absorption of bone tissue, invasion of granulation tissue and the development of osteoid structures (Limberg, 1942 and 1954; Kyanskyi, 1942; Korabeynikova, 1955; Alexandrova, 1958, and others). The method of biological preparation of bone grafts was widely used between 1930 and 1950, a period preceding the use of antibiotics (Axhausen, 1932; Kyansky, 1949; Wassmund, 1935; Key, 1937; Campbell, 1941; Limberg, 1942 and 1954; Blokhin, 1946 and 1947, and others).

The idea of biological preparation being useful not only of the graft, but also of the recipient bed prior to transplantation was expressed by Limberg in 1942. However, in clinical practice the method of biological preparation of the recipient bed has actually not been used. True, it may be admitted that the best conditions for bone regeneration after free transplantation are given shortly after formation of the recipient bed. Postponement of transplantation after surgery in the bed is considered undesirable, because it slows down regeneration.

In 1965 a method of transplantation of minced bone using a revolver syringe was introduced (Limberg, 1968, 1970 and 1971) at the Maxillo-Facial Department of Vreden's Institute of Traumatology and Orthopaedics. This method permits implaning particles of minced bone into a bone defect with a minimal skin incision, only big enough to introduce the cylinder of the syringe, and blunt dissection of subcutaneous tissue and muscles. The bone particles with edges measuring 3—5 mm in length are emitted from the syringe under pressure, bluntly separate the soft tissues, and become to lie between them in the form of small columns. The soft tissues surrounding the bone defect are thus only slightly damaged and a close contact between them and the bone grafts is established. Then, when the postponed bone transplantation is performed sometime later, a recipient bed has been formed with avoidance of great damage to the tissues of the bed and the new connections which have developed as a result of the first operation.

Employment of the above method of bone transplantation has created the necessary conditions for studying the changes taking place in the tissues of the recipient bed after its formation and also their influence on the results of the subsequent postponed bone plasty.

The authors studied the character of changes taking place in the tissues of the recipient bed after creation of a diaphyseal defect in a long bone as well as the regenerative process after bone plasty of this defect, when carried out without preceding preparation of the bed and after its biological preparation.

MATERIAL AND METHODS

Three series of experiments were carried out on adult dogs. The diaphysis of the ulna was chosen for investigation. In the first series (24 dogs) a segment measuring 2 cm in length was sawn off the ulnar diaphysis together with its periosteum. The wounds were sutured layer by layer. In the second series (80 dogs), immediately after formation of the bone defect and suturing of the soft tissue wound, minced autologous cancellous bone was introduced between the bone ends of the diaphyseal stumped using a revolver syringe (primary bone plasty). In the third series (32 dogs), bone plasty was carried out in the same way under conditions of biological preparation of the bed two to three weeks after creation of the diaphyseal defect (postponed bone plasty).[1])

[1]) An account of the surgical technique of primary and postponed transplantations of minced bone with the revolver syringe is given in the paper of Limberg et Bok, Vestn. Chir., 1970, pp. 107—114.

Changing the dressings and immobilization of the limb during the post-operative period was not practised.

Clinical and roentgenological check-ups of the animals were carried out prior and after resection of the ulnar diaphysis, prior and after bone transplantation, then three days, one, two and three weeks after operation and afterwards every month for a period of two years. The animals were sacrificed by air embolism after certain periods.

Table

Histomorphological Characteristics of Regeneration in Region of Diaphyseal Defect of Ulna in Dogs after Implantation of Minced Autologous Cancellous Bone Using Revolver Syringe

Time after bone plasty	Object of observation	Histomorphological characteristics	
		Primary bone plasty (without biological preparation of recipient bed)	Postponed bone plasty (in biologically prepared recipient bed)
2 weeks	Bone stumps of ulna Endosteal and periosteal zones near surfaces of ulnar bone stumps	State of transformation Proliferation of connective tissue with fine fibres, network of osteoid and single osseal cancelli	Decoration of bone stumps. Evident transformation. Proliferation of network of young bone cancelli
	Recipient bed	Detritus. Granulation tissue of fine fibres	Mature granulation tissue mostly consisting of fibroblasts, osteoblasts and blood capillaries
	Bone grafts in defect	Necrobiosis	Osteoclastic absorption. On graft surfaces large areas of new osteoid tissue and single bone cancelli
8 weeks	Ulnar bone stumps	Formation of cancellous bone	Transformation of cortical into cancellous bone
	Endosteal and periosteal zones near ulnar stumps	Wide-mesh network of bone cancelli	Defect filled with cancellous bone fused with diaphyseal stumps and marked osteoblast proliferation on their edges. In cancelli, pattern of bone plates may be distinguished aswell as marked osteoblastic proliferation on their edges
	Recipient bed	Mature connective tissue of coarse fibres. Islets of cartilaginous tissue	
	Bone grafts in defect	Osteoclastic absorption. Littel formation of osteoid on surfaces of grafts	

A segment of the ulnar diaphysis measuring 80 mm in length was chosen for investigation, in the centre of which was the previously created defect. This segment was investigated by X-ray, macro- and microscopically. Since regeneration and formation of mature bone tissue is completed by the second month after the bone has been damaged, the present communication presents the results of investigation of the material taken from animals sacrificed up to two months after operation. The specimens were fixed in 10 % neutral formalin, decalcified in trilone and embedded in celloidine. The sections were stained with haematoxylin-eosin and according to van Gison.

RESULTS

The results of investigating the recipient bed (series I of experiments): The roentgenological changes in the form of calcifications of the periosteal and endosteal proliferations could only be discerned two to two-and-a-half weeks after creation of the defect. One month after operation isolated bone structures appeared on the bone ends together with further calcifications of endosteal and disappearance of periosteal proliferations. By the second month the bone stumps of the ulna had grown thinner and terminal bone plates had formed on their ends. Restoration of the diaphysis had not taken place.

The morphological investigations showed that detritus lay between the stumps of the ulna one week after operation. Near the surfaces of the sawn-off ends young granulation tissue had developed in the endosteal and periosteal zones, including small osteoid cancelli (Fig. 1a). The bone tissue of the bone ends had lost calcium salts and started to be absorbed.

Two to three weeks after operation large fields of granulation tissue were found between the bone ends of the diaphysis. This tissue contained a large number of cells and blood capillaries with thin walls (Fig. 1b). In the periosteal and endosteal zones of the bone stumps a wide-mesh network of osteoid-osseal cancelli had formed, covered with chains of osteoblas (Fig. 1c). Signs of transformation could be discerned on the stump ends.

One month after operation, the region of the bone defect was filled with mature granulation tissue of coarse fibres. In the periosteal and endosteal zones of the stumps, fields of cancellous bone could be distinguished, which linked the cortical layers of the ulnar stumps with each other.

By the second month after operation, the bone defect was filled with scar tissue. Terminal bone plates had developed on the ends of stumps.

Regeneration after primary and postponed bone plasty (series II an III of experiments): On registering the results of primary and postponed plasties of the defect in the ulnar diaphysis, considerable differences in the course of regeneration were detected between the cases of primary bone transplantation without preliminary preparation of the recipient bed and those of postponed plasty after biological preparation of the bed.

The clinico-roentgenological investigations showed that in primary bone plasty, one month after operation, transformation and partial absorption of the

transplanted bone particles had taken place. Two to three weeks after operation, calcification of periosteal and endosteal proliferations near the stump ends of the ulna were found. By the second month, the stumps of the ulna and the bone grafts had fused into a solid core in half the number of operated on dogs. Two to six months after operation, transformation of the restoring segment of bone continued with gradual normalization of bone structure. In the remaining animals, only incomplete bridging of the defect with bone tissue was found two months after primary bone plasty. In the further course, a pseudarthrosis developed in the ulnar diaphysis.

In postponed bone plasty, the bone mass was transplanted in a bed in which distinct shadows of periosteal and endosteal proliferations could, as a rule, already be found in the X-ray. Absorption of the minced bone implanted in the defect was less marked. Four to six weeks after operation, the ulnar diaphysis had been restored in most operated-on animals. Transformation of the ulna proceded more intensively and in shorter time.

The results of histological investigations are registered in the table, where it is evident that when minced bone is transplanted in a bed after biological preparation, regeneration is more active and bridging of the defect with cancellous bone in the process of becoming cortical is completed by the eighth month after bone plasty. The histological features of regeneration in postponed bone plasty are reflected in Fig. 2.

CONCLUSIONS

1) Resection of a diaphyseal segment of the ulna in dog leads to changes in proliferation of cell elements in the periosteal and endosteal zones and between the bone stumps near the surfaces of the sawn-off areas. Two to three weeks after operation, granulation tissue rich in blood capillaries proliferates in the space between the bone stumps. Near the sawn-off surfaces of the bone stumps, osteoblastic both osteoid-osseal and osteoid proliferation takes place. Later the bone defect is filled with scar tissue. The ends of the ulnar stumps have separated themselves from the fibrous tissue by terminal bone plates. The integrity of the diaphysis is not restored.

2) The best conditions for regeneration of bone in the recipient bed, according to the authors' findings, are created two to three weeks after operation, because by that time the sequelae of tissue injury have almost disappeared and the recipient bed is filled with young granulation tissue which is well vascularized.

3) The results of the comparative study of regeneration after primary and postponed transplantation of minced cancellous bone using a revolver syringe have shown considerable intensification of the osteoblastic process provided the recipient bed has undergone biological reparation. Implantation of bone grafts in a biologically prepared bed filled with mature granulation tissue and where the stump ends of the ulna have been considerabl transformed, leads to intensification of osteoblastic proliferation. Regeneration proceeds more actively

and restoration of bone integrity is completed in a shorter time than if transformation of bone takes place in a recipient bed which has not been prepared beforehand.

4) The study has confirmed Limberg's thesis of 1942 concerning the usefulness of biological preparation of the recipient bed in bone plasty. B. K.

SUMMARY

Clinico-roentgenological and histological investigations were carried out in experiments on dogs: 1) of changes taking place in tissues of the recipient bed created by resection of a segment of the ulnar diaphysis measuring 2 cm in length together with its periosteum; 2) of the stages of regeneration after implantation of minced autologous cancellous bone in the bone defect immediately after operation (without preliminary biological preparation) and two to three weeks after injury (under conditions of preliminary biological preparation). It was disclosed that the most favourable conditions for bone regeneration in the bed had developed at the period of two to three weeks after primary operation and that biological preparation of the recipient bed was useful, because it stimulated incorporation of the graft and considerably shortened the time of restoration of bone integrity.

RÉSUMÉ

Sur le rôle du lit récipient dans la greffe osseuse libre

A. A. Limberg, V. V. Nekatchalov

Dans les expériences sur les chiens, on a fait des observations radiologiques et histologiques: 1° observations des modifications apparaissant dans le lit récipient formé par une résection de 2 cm de diaphyse du cubitus, le périoste y comoris, 2° observations des étapes du développement du processus de régéneration se présentant après la transplantation de l'os spongieux autogène broyé au niveau du défaut immédiatement après son apparence (sans préparatifs biologiques du lit récipient) et après deux ou trois semaines après la blessure (s'il y avaient des préparatifs biologiques). Il s'est montré que les meilleures conditions d'une régénération suivante de l'os dans le lit existaient dans la période dès deux à trois semaines après l'opération et que les préparatifs biologiques du lit étaient utiles parce qu'ils provoqent une stimulation des processus de la prise du greffon osseux et activent notablement la restitution de l'intégrité de l'os.

ZUSAMMENFASSUNG

Über die Rolle des Empfängerbettes bei der freien Knochentransplantation.

A. A. Limberg, V. V. Nekatschalow

Bei Versuchen an Hunden wurden klinisch-röntgenologische und histologische Beobachtungen durchgeführt, die sich als Ziel setzten, folgendes zu untersuchen: 1) Veränderungen, die im Empfängerbett durch Resektion von 2 cm der Ulnardiaphyse einschliesslich des Periosts entstehen, 2) Entwicklungsetappen des Regenerationsprozesses nach Transplantation des zermalmten autogenen spongiösen Knochens in den Defekt unmittelbar nach seiner Bildung (ohne biologische Vorbereitung des Empfängerbettes)

und zwei bis drei Wochen nach Verletzung (unter der Voraussetzung vorangehender biologischer Vorbereitung. Es ergab sich, dass die besten Bedingungen für die Wochen nach der Operation geschaffen werden und dass die biologische Vorbereitung des Bettes zweckdienlich ist, da sie die Einheilungsprozesse des Knochentransplantates stimuliert und die Wiederherstellung der Knochenintegrität wesentlich beschleunigt.

RESUMEN

Sobre el papel del lecho recipiente en la transplantación libre del hueso

A. A. Limberg, V. V. Nekachalov

En los experimentos en perros fueron hechas observaciones radioscópicas e histológicas: 1) de los cambios que aparecen en el lecho recipiente formado por una resección de 2cm en la diáfisis del cúbito incluso el periosteo; 2) de las etapas del desarrollo del proceso regenerativo después de la transplantación del hueso espongioso autógeno triturado al defecto inmediatamente después de crearse el mismo (sin preparación biológica del lecho recipiente) y dos o tres semanas después de haber sida hecha la herida (suponiendo preparación biológice previa). Se mostró que las mejores condiciones para la regeneración siguiente del hueso en el lecho existían en el período de dos a tres semanas después de la operación y que la preparación biológica del lecho era útil porque provoca la estimulación de los procesos de la adhesión del trasplante autotópico óseo y acelera la restitución de la integridad del hueso.

REFERENCES

1. **Alexandrova, E. A.** (1958), **Korabeynikova, L. A.** (1955), **Kyansky, A. A.** (1942 and 1949): quoted by Limberg, A. A. in 1942 and 1954.

2. **Blokhin, V. N.**: "Delayed" Transplant in Treatment of Pseudarthrosis and Bone Defects. Papers of CITO, Ministry of Health of USSR. Bone Plasty, Amputation and Fitting of Artificial Limbs. Moscow, 1—II : 15, 1947.

3. **Limberg, A. A.**: On Preliminary Biological Preparation of Bone Grafts and Recipient Bed by Free Transplantation of Autologous Bone. Papers of Leningrad Doctors during World War II. Leningrad, I : 66, 1942.

4. **Limberg A.**: Free Bone Transplantation in Mandibular Defects. Papers of Institute of Traumatology and Orthopaedics. Leningrad, IV-226, 1954.

5. **Limberg Alla A., Bok, V. F.**: Experience with Bridging Bone Defects with Minced Cancellous Bone using Revolver Syringe, Vestn. Chir., 105, 12 : 107, 1970.

6. **Limberg, Alla A., Krasonskaya, G. P.**: Dynamics of Metabolism of Some Bone Tissue Components after Bridging Bone Defects in Dogs with Minced Autologous Cancellous Bone Grafts. Vestn. Chir., 2 : 105, 1971.

7. **Axhausen, G.** (1928 and 1932), **Imbert, L., Real, P.** (1917), **Wassmund, M.** (1935): quoted by Limberg, A. A. (1942, 1954).

8. **Brooks, B., Hudson, W. A.**: Studies in Bone Transplantations. An Experimental Study of Comparative Success of Autogenous an Homogenous Transplants of Bone in Dogs. Arch. Surg., 1 : 284, 1920.

9. **Campbell, W. C., Boyd, H. B.**: Fixation of only Bone Grafts by Means of Vitallium Screws in the Treatment of Ununited Fractures. Am. J. Surg., 51 : 748, 1941.

10. **Key, J. A.**: Treatment of Nonunion of Fractures with Bone Grafts Fixed by Metal Screws. Surgery, 1 : 730, 1937.

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Legend to the Figures on the Chalk Enclosure

Fig. 1. Section of granulation tissue taken from defect near sawn surface of ulnar stump (stained with haematxoylineosin): a) one week after creation of defect: Near sawn surface proliferation of young granulation tissue with islets of osteoid tissue can be seen; on diaphyseal stump ends structure of bone tissue is becoming blurred (x 135). — b) two weeks after creation of defect: granulation tissue contains large numbers of fibroblasts and osteoblasts as well as thinwalled blood capillaries; formation of osteoid cancelli (x 200). — c) two weeks after creation of defect: on surfaces of young bone cancelli layers of osteoblastic tissue can be seen (x 200). — Fig. 2. Section of granulation tissue taken from defect after postponed bone plasty (stained with haematoxylineosin): a) two weeks after bone plasty: bone grafts surrounded by fields of granulation tissue which includes clusters of osteoeblasts, marked osteoclastic absorption of bone particles (x135). — b) two weeks after bone plasty: formation of young bone cancelli in granulation tissue which fills defect (x 135). — c) eight weeks after bone plasty: cancellous bone with chains of osteoblasts on surfaces of bone cancelli filling entire diaphyseal defect of ulna (x135)

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MATHEMATICAL PLANNING FOR LOCAL PLASTY IN HYPOSPADIAS

D. D. MURVANIDZE, S. Y. KOCHAROVA

The chief cause of failure of plastic operations for hypospadias is a deficit in skin requist for construction of the urethra and the coverage of the skin defect on the penis. The difficulty in choosing the most rational method of plasty for correction of the anatomical picture of the anomaly plays an important part; frequently the choice is left to the surgeon's institution, i.e. to subjective premisses. This is why unforeseen shortage of plastic material may occur during operation, which leads to tension in wound edges, defective blood supply to the skin and ultimately to suture dehiscence, development of skin defects and fistulae.

The authors tried to solve the problem of choice by plannig the operation, i. e. by calculating the amount of plastic material available for the purpose.

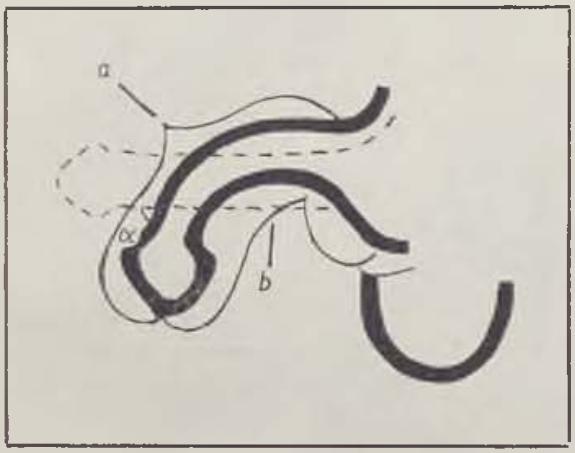
Of the 256 children with hypospadias treated at the Department between 1965 and 1971, 106 patients were suffering from forms requiring urethroplasty. In 17, the shape of the penis had also to be corrected, 89 patients required treatment in stages, and 68 urethroplasty. Mathematical planning of the operation was carried out in all these cases.

Measurements carried out in these patients showed that hypospadias depends on the degree of chordee; the larger the angle of chordee the larger the difference between the lengths of the dorsal and ventral aspect of the penis. This difference permits to determine the skin deficit in a longitudinal direction on the ventral aspect as well as the degree of hypospadias after straightening of the penis, i.e. the true degree of hypospadias (Fig. 1).

When straightening the penis, one form of hypospadias frequently changes into another, so that the external orifice of the urethra becomes displaced onto the part of the ventral surface which is bared of skin. This part has the shape of a triangle or a rhomb when the penis is straightened after an angular incision. The angular incision makes displacemet of the external orifice and complete correction of chordee possible (Fig. 2).

For determination of the reserve of skin available on the body of the penis, the length of the skin circumference must be measured by smoothing-

out all skin folds, yet avoiding to subject the skin to tension; the circumference of the penile body proper must be determined by winding the measuring tape tightly around it. Measurements have shown that the ratio between the circumferences of skin and penile body is always larger than one. It depends on individual development of the penis and its skin cover and not



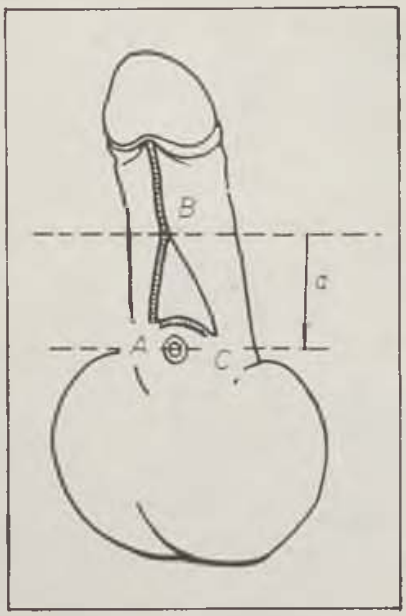


Fig. 1. Comparison of dorsal and ventral legths of penile surface. a = length of dorsal aspect, b = length ventral aspect, a—b = difference between dorsal and ventral aspects; α = angle of chordee. — Fig. 2. Degree of external orifice displacement after straightening of chordee. a = degree of dystopy; triangle ABC = area on ventral aspect bared of skin after correction of chordee

on the form of hypospadias or the age of the patient. If the ratio is smaller than 1.5, urethroplasty leads to a skin deficit; if it is near two, the conditions for the plasty are more favourable (Fig. 3).

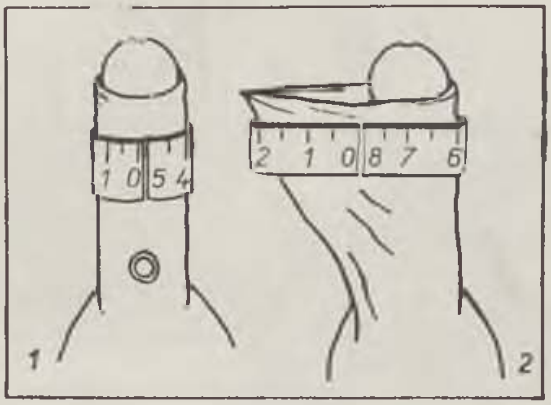
The skin reserve of the prepuce (Fig. 4) is composed of the skin areas of its inner and outer leaves. The length of the prepuce may be measured in millimeters from tip to the coronary groove and then doubled. In order to determine the skin reserve of the prepuce in a transverse direction, its base must be measured. When the separated leaves of prepuce are transferred onto the ventral aspect of the penis, the main condition is that the lengths of the two leaves of prepuce correspond to that of the wound surface so that they can cover it without tension.

The skin reserve of the scrotum in cryptorchism and under-development of the testicular tunics always suffices.

When covering triangular defects, approximation of wound edges leads to their tranfer towards the midline, i.e. to the site of the triangular height. The side which is larger than the height of the triangle and the increase in length of wound edges equals the difference between the length of the side and the height of the triangle. Coverage of the wound with angles of 30^0 to 90^0

takes place under conditions of a slight increase in length; with an angle of 120^0, the increase in length consists of half the side, which corresponds to the width of the skin, the loss of which by far exceeds the increase in length. Consequently, coverage of the wound by this method in inadequate, because it amounts to a skin deficit in a transverse direction.

In order to lengthen the wound edges, an incision is made at right angles to the wound edges. This, the primary incision, runs in a longitudinal direction



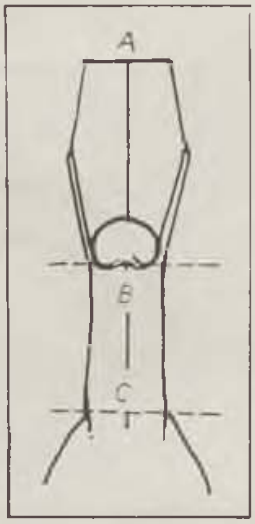


Fig. 3. Definite reserve of skin on penile body. 1 = measurement of penile circumference; 2 = measurement of circuference of smoothed out skin. — Fig. 4. Definite reserve of skin of separated leaves of prepuce. AB = length of separated prepucial leaves, BC = length of area to be covered with prepuce

exactly along the midline of the ventral aspect of the penis and, in case it does not reach the external orifice of the urethra, it splits up into two branches which run to its lateral aspects. After excision of the scar area and straightening of the cavernous bodies, the wound edge is lengthened by incisions at right angles; this increases the length of the wound edge in a zigzag shape (Fig. 5).

Calculation of the side incisions is based on the following: The edges of the side incisions diverge to the sides at angles from 0^0 to 90^0 and more. When lengthening the transverse incision (cathetus), the hypotenus is lengthened and thus also the wound edge. This is done on acount of the skin reserve in a transverse direction. Consequently, such an incision may be used if there is sufficient skin reserve in slight cases of hypospadias and also as a constituent part of other surgical methods.

For lengthening of wound edges, the authors used angular incisions ("poker" incisions) which lengthen the wound edges to more than twice the length of the side incision. The skin is incised longitudinally on the ventral aspect of the penis starting at the external orifice of the urethera and terminating at the coronary groove; here the incision splits up into two branches running towards the side aspects approximately to one quater of the circum-

ference on either side at an angle of 90^0 (Fig. 6). Suturing of the wound in a longitudinal direction is easy due to opening of the angles and the extreme elasticity of the skin. This incision permits transposition of skin of the prepuce onto the ventral aspect of the penis.

In severe forms of hypospadias the method of opposing triangular flaps, as developed by Savchenko, proved of advantage. It consists of formation of asymmetrical flaps of various shape and during mutual exchange the skin of the asymmetrical areas is transposed.

In accord with Limberg, length increases and width diminishes with enlargement of angles of the side incisions. Symmetrical figures of the triangular flaps under angles of 75^0 give 100 per cent of a general lengthening,

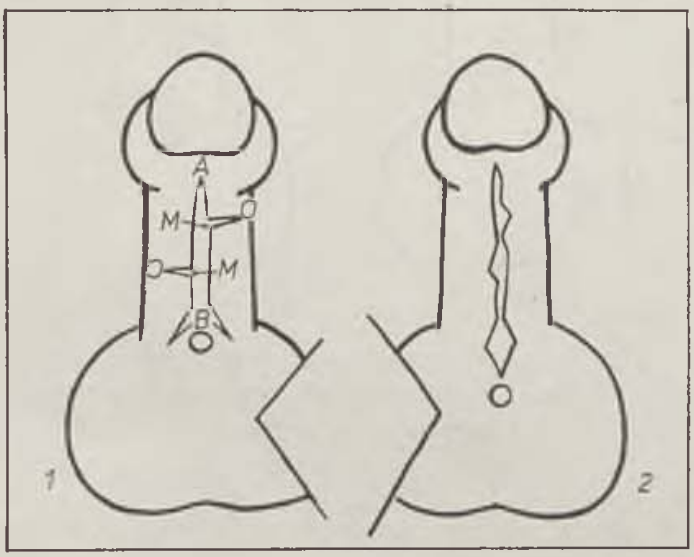


Fig. 5. Increasing of the length of the wound egde in a zigzag shape

50 % at each end of the median incision and this is the reason why they are so valuable from a practical point of view, and symmetrical figures of opposing triangles under angles of 60^0 result in a 36.5 % increase in length at each end and side of the figure of the triangular flaps with regard to the length of the median incision.

The authors assume that straightening of chordee using opposing triangular flaps in any form of hypospadias makes the methods of straightening uniform; it is possible to shape the triangular flaps so that the skin of the prepuce or that of the scrotum is transposed onto the ventral aspect of the penile body, if there is a skin deficit.

Planning urethroplasty provides two procedures: lengthening of the short urethra and covering of this new tube with skin. It is also necessary to provide that the operation be as radical as possible, because a secondary urethroplasty is carried out under less favourable conditions (cicatrization of skin).

Urethroplasty with the employment of skin from the body of the penis and also that using skin of the ventral aspect of the penis and the prepuce is

carried out with the view to the skin reserve: If it is sufficient, i.e. approximately at a ratio of 2 : 1, good results are achieved with the method of Duplay and in less skin reserve with those of Browne or Birkenfeld.

Appraising Duplay's urethroplasty based on mathematical calculation of the amount of skin available, the authors arrived at the conclusion that the method is simple, suitable and inexacting to the patient, and additional oper-

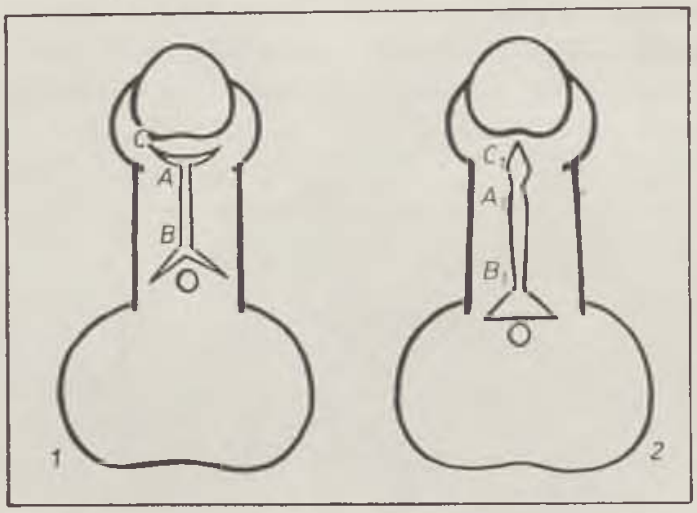


Fig. 6. Lengthening of wound edge by "poker" incision in projection of prepuce: 1 = "poker" incision (ACIAB; 2 = position of points C, A and B after lengthening of wound edge (AC and B)

ations for drainage of urine are unnecessary. If the skin reserve is sufficient and the operation is correctly carried out, urethroplasty is bound to be successful.

The classical method of Browne was slightly simplified by the authors because of abstaining from special drainage of urine and from additional incisions for draining the wound and introducing a skin suture using perpenpedicular mattress stitches (of thin kapron).

Lack of skin (up to 15 mm) on the body of the penis may be compensated by a relaxation incision according to Meyer, yet if the skin deficit is larger, relaxation incision according to Browne or the method Birkenfeld are recommendable.

With the latter method the urethra is constructed from the skin of the ventral aspect of the penile body according to the principles laid down by Duplay, i.e. coverage with the separated leaves of the prepuce transposed onto the ventral aspect and sutured to the woud edges. Employment of this method depends on the lengths of the separated leaves of the prepuce corresponding to the length of the wound area. The method is particularly efficacious in older children.

As has been shown by observations, in draining urine through a perineal urethrostomy or a suprapubic cystostomy after straightening of chordee plus

urethroplasty, urine is always spattered into the newly constructed urethra, becomes stale and leads to infection of the wound. In view of this, the authors decided to use the urine for formation of the urethra and, at the same time, as a means of disinfecting the wound. With this purpose in mind, they permitted the child to urinate through the newly formed urethra; no retention of urine, suppuration of the wound, dehiscence of sutures or haematomas were ever observed. Fistulae developed in a few patients due to late removal of stitches (ten to eleven days after operation), which induced the authors to shorten the time and remove the stitches seven to eight days after operation, and the results proved better.

The authors' observations have shown that the method of urethroplasty should be chosen with regard to the skin reserve available and the form of hypospadias. When correct surgical technique is applied and inert suture material used, the treatment of hypospadias is bound to be successful.

CONCLUSIONS

1) Mathematical planning of local plasty in severe forms of hypospadias permits choosing the surgical method which is best suited for avoiding a skin deficit during operation, which is one of the most important causes of failure.

2) The skin deficit equals the difference between the dorsal and ventral lengths of the penis and corresponds to the length of the skin wrapping, i.e. the ratio between the measures of the skin wrapping and the body circumference of the penis.

A skin reserve of 2—1.5 : 1 guarantees the operation to be carried out without a skin deficit. If this ratio is smaller, relaxation incisions or the method using the skin of the prepuce should be employed. B. K.

SUMMARY

For planning of plastic operations (correction of chordee and urethroplasty) in patients with hypospadias, the authors employ a definite reserve of plastic material (skin of the penile body and the leaves of the prepuce) using simple measurements. This allows to choose the most rational method for every case and execute it without a skin deficit.

RÉSUMÉ

Programmation mathématique de la plastie locale en cas de hypospadias

D. D. Murvanidze, S. J. Kotcharova

La programmation des operations plastiques (correction du pénis recourbé, uritroplasties) chez les malades avec hypospadias, les auteurs utilisent de certaines réserves du matériel plastique (peau provenant du corps de pénis, feuilles de la prépuce) à l'aide de mesures simples. Ça permet de choisir le mode le plus rationnel concret et de faire la plastie sans une perte cutanée.

ZUSAMMENFASSUNG

Mathematische Planung der Lokalplastik bei Hypospadie.

D. D. Murvanidze, S. J. Kotscharowa

Zur Planung der plastischen Operationen (Korrektur der Krümmung des Penis, Urethroplastik) bei Kranken mit Hypospadie benutzen die Autoren einen bestimmten Vorrat des plastischen Materials (Haut vom Peniskörper, Vorhautblätter) mittels einfacher Messungen. Dies ermöglicht die Wahl des rationellsten Verfahrens für jeden konkreten Fall sowie das Durchführen der Plastik ohne Hautdefizit.

RESUMEN

Programación matemática de la plástica local en los casos de hipospadias

D. D. Murvanidze, S. Y. Kocharova

Para la programación de las operaciones plásticas (corrección del pens recurvado, uretroplatia) en los enfermos con hipospadia los autores emplean una cierta reserva del material plástico (la piel del cuerpo del penis, las hojas del prepucio) mediante mediciones simples. Esto permite elegir el modo más racional para cada uno caso concreto y performar la plástica sin pérdida alguna de la piel.

REFERENCES

1. **Doletskyi, S. Y., Korolkova, I. A.:** Hypospadias in Children. Urologia, 3 : 6, 1964.

2. **Limberg, A. A.:** Planning of Local Plasties, Leningrad. Medgiz, 1963.

3. **Savchenko, N. Y.:** Hypospadias and its Treatment. Minsk 1962.

4. **Birkenfeld, W.:** Beitrag zur Operation der männlichen Hypospadie. Arch. klin. Chir., 145 : 445, 1927.

5. **Browne, D.:** An Operation for Hypospadias. Proc. Roy. Soc. Med., 42 : 466, 1949.

6. **Duplay, S.:** De l'hypospadias perineoscrotal et de son traitement chirurgical. Arch. gen. med. (Paris), 133 : 513, 657, 1874.

7. **Meyer, H. W.:** Hypospadias, Surgery, 8 : 781, 1940.

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COMPARABLE ASPECTS OF THE EMPLOYMENT OF SOLID AND SPLIT HOMOTRANSPLANTS IN BRIDGING LARGE SEGMENTAL DEFECTS IN LONG BONES

G. I. LAVRISHCHEVA, M. G. GRIGORIEV, A. A. ABAKAROV

At present transplantation of homologous bone is widely used in orthopaedic surgery and traumatology, including the bridging of large segmental defects in long bones. Among bone plasties no small percentage is occupied by the bridging of a missing segment of a long bone using a homotransplant of analogous shape. The usefulness of such a mode of plasty has been recognized by many surgeons (Imamaliev, 1960; Kovalenko, 1961; Korzh et Talyshinskyi, 1966; Zatsepin et al., 1970; Janeček et Horn, 1963; Wilson, 1965; Jaroš, 1967; Bose, 1967; Merle d'Aubigne, 1969, and others). However, the late results of plasties using massive homotransplants are not always favourable. Complications, such as late suppuration, fragmentation of transplants and fracture are observed in 22 to 31 % of cases (Judet et Judet, 1954; Talyshinsky et Zhmurko, 1968; Makson, 1970).

The unfavourable late results when using massive transplants of homologous bone made it imperative to review whether or not it was rational to carry out such operations, the more so, because when using multiple split cortical grafts of homologous bone such complications do not arise.

With this task in mind, the authors analysed the results of 249 experimental and 48 clinical cases of bridging large defects in the metaphysis and diaphysis of bones; clinico-roentgenological and histological methods of investigation were used for the purpose.

In large defects in bone both in experiments and under clinical conditions, various methods of bridging a diaphyseal defect were employed; such as: a solid long-bone homotransplant of a shape corresponding to that of the missing part (118 experimental and 13 clinical observations), 2) a split homotransplant (131 experimental and 35 clinical observations). Thus a) grafts split (sawed) lengthwise while preserving their anatomical shapes corresponding to those of the missing bone segments; b) complete splitting-up of the transplant into cortical plates and laying them flat into the defect. Thus, in the given

group of observations, splitting was effected by sawing the cortical layer of a long- bone graft forming, in some cases, inlays while preserving its anatomical shape, but in other cases using a multitude of longitudinally split plates of cortical bone.

A peculiarity of large defects is the fact that the intraosseal vascular network is disrupted to a great extent. This network supplies two-thirds of the thickness of the cortical layer of a diaphysis with blood. When reconstructing a whole bone, revascularization of the transplant by restoring the normal interosseo-medullary vascular network must be taken into account. Only this can ensure a blood supply of full value to the transplant and the regenerating bone developing from it.

First group of observations concerning the bridging of a diaphyseal defect with a solid tube-shaped homotransplant corresponding in shape to the missing part of the bone:

In the experimental part of this group the results of experiments were studied on 35 dogs and 83 rabbits. The duration of observation ranged between seven days and 14 months. In all cases the periosteum of the recipient bone was completely removed in the zone of the defect. Fixation of the transplant bridging the defect in the tibia of dogs was carried out with a thin intramedullary metal rod. It should be stated that adequate immobilization of the transplant to the recipient bone was not achieved in this way. When operating on one of the forearm bones the transplant was closely fitted to the sawn edges of the recipient bone. The other bone of the forearm served for fixation, which effected sufficient immobilization of bone ends. The length of the bone defect and the corresponding length of the tube-shaped transplant was 5 to 6 cm in dogs and 2 to 2.5 cm in rabbits.

The clinical material was collected during secondary plasties which were carried out in cases of unfavourable results of the primary operation (the transplant had not been incorporated, broken or undergone late suppuration). The material was given to the authors' disposal by the clinical wards of the Central Institute of Traumatology and Orthopaedics (CITO) (Directors S. T. Zatsepin and O. N. Gudushauri). The investigated transplants were taken from patients in whom a defect in the femure, the tibia or the humerus had been bridged. In the clinical cases fixation of the transplant to the edges of the recipient bone was effected by a device of Gudushauri.

RESULTS

Both in the clinical and experimental material the same features of the regenerative process were observed. The transplant bridging the bone defect united with the developing callus in those cases, where adequate immobilization of the bone ends had been achieved. In cases where the bone ends of recipient and transplant were well mobile over each other, union between them did not take place. The tube-shaped transplant uniting with the recipient bone also established an intimous union with the surrounding soft tissues.

By the end of the first month after operation, vessels started to appear in the vascular channels of the transplant in the layers near to its periosteal surface, and where it contacted the sawed ends of the recipient bone. The bone walls of these channels had grown wider due to smooth absorption of bone tissue. In the marrow cavity of the transplant granulation tissue with vessels had invaded, yet not deeper than 5 mm from the sawed ends. The central part of the marrow cavity of the transplant of a length of 20—25 mm, remained filled with blood-stained fluid up to the 45th day after operation, and in grafts of a length of 5—6 cm up to 3—4 months. This fluid is present because of the inadequate blood supply in the vessels invading the marrow cavity of the transplant to a small distance from its sawed ends.

By the third to fourth month after operation, independent of the length of the transplant, the vascular channels had considerably widened over the periosteal surface and at sites of union with the recipient bone. At these sites proliferations with small and narrow zones of new bone tissue were found along the walls of the vascular channels. In the deep zones of cortical layer of such transplants, near the inner stratum, absorption of bone tissue could be observed, which initiated widening of the vascular channels without forming any new bone tissue. The central part of the marrow cavity of the transplant measuring 5—6 cm was, as before, not yet filled with tissue.

Thus in solid tube-shaped transplants processes of transformation took place, but absorption of bone tissue predominated over proliferation of new tissue. When using an intramedullary rod, the lytic processes predominated, particularly in the cortical layer near the inner surface of the transplant, where it was more conspicuous and striking than in transplants, where no intramedullary fixation had been used.

Six to eight months after operation the morphological picture of transplants of various dimensions did not essentially differ from that of previous periods. Large transplants with intramedullary fixation were characterized by a more marked lysis of the inner cortical layer. On the periosteal surface of the transplant the bone matter was replaced by new and mature bone tissue to a depth of 1—2 mm. Around the transplant periosteum with its characteristical structure had developed. In the marrow cavity of large transplants the vascular network had only spread over the inner wall of the cortical layer. However, large vessels characterizing the intraosseal vascular network were not observed. In transplants of 2—2.5 cm length, however, vessels were already found in the medullary cavity.

By the 14th month after operation, the old acellular bone tissue had remained preserved in the deep cortical layers both of large and small transplants and had not yet been replaced by new bone tissue.

The study of the 13 clinical cases has confirmed the basic principles of reparative regeneration as determined by experiments on animals. The features of the clinical observations were late suppuration due to circulatory disorders in the marrow cavity and "dormant" infections in patients with a history of inflammatory processes.

Resuming the above about the bridging of a diaphyseal defect with a solid tube-shaped transplant, the following may be stated: Bony union of the transplant with the recipient bone only starts when the bone ends are adequately immobilized. Attention is also drawn to the poor reparative processes in solid tube-shaped transplants of a lenght exceeding 2 cm, because normal blood supply in the medullary cavity of the transplant could not be restored. In such a type of vascularization, transformation of the transplant could only be effected from the periosteal surface; the inner layers of the transplant which lay near the marrow cavity only underwent absorption and were not replaced by new bone tissue, a feature which led to thinning of bony matter and was the cause of the lowered firmness of bone regenerated in this way. The absence of normal intramedullary blood circulation in a large and solid tube-shaped transplant led to circulatory disorders and accumulation of blood-stained fluid in the cavity, which brought about favourable conditions for the development of "dormant" infections. This explains the incidence of late suppuration developing in the marrow cavity of homotransplant in a number of patients with posttraumatic bone defects whose history disclosed suppuration and osteomyelitis.

Second group of observations concerning the bridging of a diaphyseal defect with longitudinally split-up cortical bone plates:

A) Transplantation of longitudinally split-up cortical bone plates:

This group consisted of 191 experimental studies (61 rabbits and 40 dogs) and five patients from the Children's Department of Bone Pathology at CITO (head Prof. M. V. Volkov, Academician of Soviet Academy of Medical Sciences). In 75 experiments a diaphyseal defect in the radius was bridged and in 26 cases one in the femur. The femoral defect measured 5—6 cm, while that in the forearm 2—4 cm. In 45 cases splitting of the transplant was carried out by dividing it into many fragments measuring 2×8 mm and in 66 cases the defect was bridged with a multitude of fragmented cortical plates measuring 3×25 mm. In the patients under observation a defect in the tibia or the femur was bridged employing the method of Volkov.

RESULTS

When bridging the defect with a multitude of cortical bone fragments, new bone in the form of primitive bone cancelli developed around all fragments by the end of the first week. By the second week, in case the defect had been completely filled with grafts (at distances between the fragments not exceeding 1 mm), a single bony mass consisting of a network of newly formed bone cancelli linking the many fragments of the transplant to each other had developed all over the defect.

By the 30th day after operation, the callus filling the defect and linking up the bone transplants, had become more mature. The borderline between

newly formed and old acellular bone could not always be distinguished. The vascular channels in the transplant were widened and vessels were clearly visible in them.

By the second month after operation, absorption of the transplanted bone tissue and its replacement by new bone had continued not only on the surface of grafts, but also inside them along the vascular channels. The new bone tissue was on the whole mature which had led to fragmented bone grafts losing the borderlines between the original acellular and the new bone tissue. This mass in the region of the defect consisted of sections of irregularly shaped acellular and new bone tissue. When using cortical bone plates split up longitudinally, the shapes of grafts could still be discerned even if already wrapped in new bone tissue. The vascular channels of such transplants were filled with vessels.

By the sixth to eighth month after operation, when the diaphyseal defect had been bridged with multiple cortical plates, not only the entire missing bone part, but also the typical bone structure of the diaphysis had almost been restored.

The time required for complete restoration of structure depended on the size of the defect. Thus, in a defect of the forearm measuring 3—4 cm in length, the structure was restored by the eighth to tenth month. By that time even the smallest enclosures of acellular bone tissue had disappeared. In a defect of the femur, measuring 4—6 cm in length, regeneration of bone identical in shape and structure with the missing part of the organ took twelve months.

In five cases of incompete bridging of the defect with transplants, where the distances between fragments amounted to more than 1—2 mm, the regenerated part was not of full value showing larger inclusions of fibrous or cartilagionous tissue. In these cases pseudoarthrosis developed.

B) Bridging the defect with longitudinally divided bone grafts with preserved anatomical shape: In 30 experiments of this series a defect in the radius of rabbit was bridged with tube-shaped homotransplants longitudinally sawn through the entire thickness of the cortical layer, preserving the anatomical shape of the transplanted segment.

RESULTS

Seven days after operation, the transplanted bone had linked up with the recipient bone by means of fibrous tissue. During bony union of these transplants the same features were observed as in the cases where solid tube-shaped transplants had been used.

By the 30th day after operation, the bone ends of the transplants had united with the ends of the recipient bone by means of a periosteal intermediary and endosteal callus. In most vascular channels of the sawn-through cortical layer of the graft vessels had appeared. Its marrow cavity was filled with fibrous tissue rich in vessels (Fig. 1). On the sawn surfaces of the trans-

plants' cortical layers there was osteoblastic tissue, where bone cancelli were developing.

By the 45th day after operation maturation of the new bone at the sites of union between transplanted and recipient bone could be observed. Apart from that processes of transformation of bone tissue of the transplant

Fig. 1. Histological picture 30 days after transplantation. In most vascular channels of the cortical layer of the transplant vessels can be seen. Here as well as in figs. 2 and 3: microphotograph stained with haematoxylin-eosin, magn. 140×

were disclosed together with absorption of bone matter along the vascular channels and depositing of new bone tissue on their walls.

By the 90th day after operation most parts of the cortical transplant were replaced by new bone tissue. In the marrow cavity of such transplants fibrous tissue rich in vessels (Fig. 2) could be distinguished. At the same time most of the acellular bone tissue with narrow vascular channels, most of them empty, had been preserved in the tube-shaped transplants which had remained the same in shape and size as the sawn tube-shaped grafts originaly implanted. In the marrow cavity of these solid grafts fibrous tissue poor in vessels had developed (Fig. 3).

One year after operation, when comparing the reparative processes in transplants of longitudinally sawn fragments with those without such fragments, a distinct difference of the morphological picture could be distinguished, no matter whether or not the transplants had been of the same type as to their shapes and sizes. While in the former the processes of transformation could be considered terminated and the grafts had been replaced by regenerated bone of a structure typical of the organ, the solid tube-shaped transplants had preserved a considerable amount of their acellular bone tissue. When bridging a defect with a solid tube-shaped transplant, the anatomical integrity of the

bone is also reconstructed, but preservation of a considerable amount of the donor bone prevents development of normal microstructure of bone reconstructed in this way.

The favourable results of experimental employment of tube-shaped bone grafts with longitudinally sawn fragments permitted to use this method on patients. However, the favourable results in this group can only be based on clinico-radiological findings.

At the Children's Department of the Gorky Institute of Traumatology and Orthopaedics (head A. M. Svobodova), this method was employed by the authors in 30 children after removal of benign bone tumours and limited bone affections. In all cases the tube-shaped bone intended to be implanted was chosen according to the shape of the recipient bone. The bone grafts were placeed in warm physiological saline with antibiotics added 30 min. before operation. Prior to implantation the grafts were stripped of periosteum, the bone marrow was mechanically removed and the marrow cavity rinsed with warm saline using a Janet syringe.

For fixation of the transplant to the recipient bone metal devices and screws were used. The fixation of bone ends must be sufficiently reliable and

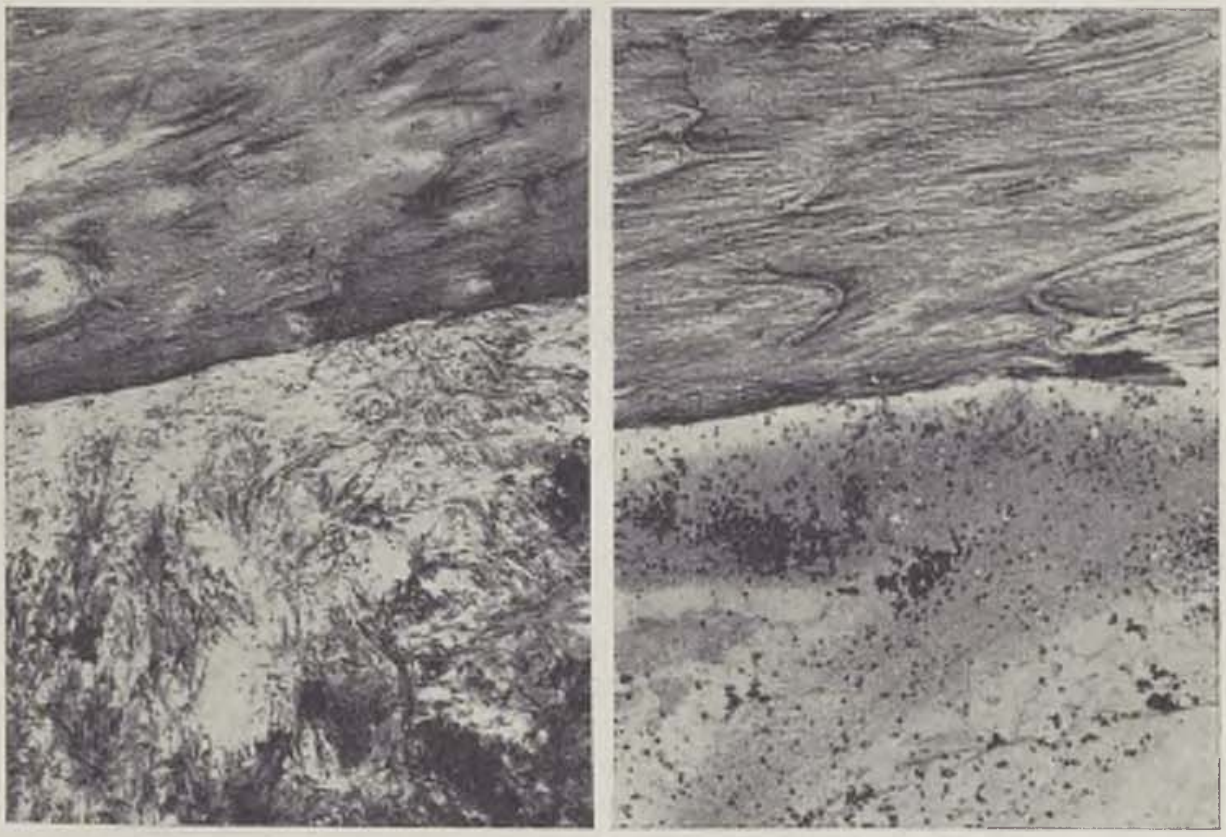

Fig. 2. Histological picture 90 days after transplantation. In marrow cavity of transplanted bone plates fibrous tissue rich in vessels can be seen. — Fig. 3. Histological picture 90 days after transplantation. Vascular channels of transplant are empty, the same as marrow cavity

simple. The requirements are met by shaping the bone ends into cylinders as suggested at the Gorky Institute by Abramov (1964).

The method of implanting longitudinally sawn-off bone plates in clinical cases was the same as had been used in experiments. The graft was first made to fit the defect, the bone ends were shaped according to Abramov and then sawn into longitudinal plates, using an electrical circular saw, which then were applied to the entire thickness of the cortical layer in a way that they did not reach to the ends of the transplant. The bone plates lay at distances of 0.5—0.7 cm from one another with fields of 1.5—2.0 cm in width remaining at both limiting areas. A bone shaped in this way remains sufficiently firm.

For the sake of an example, the history of K., a boy aged twelve who was admitted to the Institute on Dec. 15, 1970 with the diagnosis of cystic osteoblastoclastoma in the upper third of the humerus with pathological fracture, is presented below:

In the X-ray a regular swelling of the humerus in the region of the metaphysis with considerable thinning of the cortical layer and a pathological fracture (Fig. 4) was found. Puncture of the region produced a light yellow fluid. The cytologist concluded that this was a bone cyst. On Dec. 22, 1970, the patient was operated on: A segment of the upper third of the humerus was excised and the defect bridged with a homotransplant identical in form and sawn into longitudinal plates while preserving its anatomical shape (Fig. 5). The postoperative period was uneventful. The wound healed by first intention.

Eight months after operation the transplanted bone had completely united with the recipient bone and transformation had begun (Fig. 6). Eighteen months after operation the structure of the humerus and its marrow cavity had been restored. Growth of the limb was not affected. The structure of the transplant does not differ from that of the recipient bone (Fig. 7). At present the patient is practically cured and is enjoying sports.

A total of thirty patients were operated on by the above method and the results were good; they were checked up from one to three years after operation.

CONCLUSIONS

As was shown by the analysis of experimental and clinical material, considerable differences between bridging diaphyseal and metadiaphyseal defects in long bones with either solid or fragment transplants were found with regard to the character of the reparative processes. When massive solid transplants had been used, disregarding the union between the graft and the recipient bone, the organic restoration of bone was not completed, because normal intraosseal and intramedullary blood circulation of bone tissue had not been restored. In this process, absorption of bone tissue in massive homotransplants greatly predominated over proliferation of new bone tissue. This resulted in a slow decomposition of bone structures and a decrease in firmness of the reconstructed bone regenerating in this way.

When using fragmented transplants for bridging of diaphyseal defects either as sawn cortical bone plated or as tube-shaped grafts or as a multitude of split cortical plates, regeneration of the damaged bone not only took place, but also its anatomical shape was restored with almost complete restoration of its microstructure. Breaking a bone graft up into small particles or sawing the cortical layer into plates greatly facilitates the access of blood vessels from the recipient bone, which results in a better blood supply to the transplant.

CONCLUSIONS

1) Comparative morphological appraisal of the character of reparative processes in bridging defects with solid and fragmented tube-shaped homotransplants has convincingly shown that employment of massive solid homotransplants is not suitable.

2) Of the two methods of fragmentation (longitudinal division of tube-shaped bone with a saw and preservation of its anatomical shape and longitudinal fragmentation of the cortical layer into cortical bone plates) by far the best method is longitudinal division of the cortical layer with preservation of the anatomical shape of the tube-shaped transplant. The advantage of such a transplant lies in the preservation of its anatomical shape, if the supporting role of the transplant in the process of regenerating the missing bone part is taken into account. When using many fragments arranged into longitudinal bone plates, restoration of the normal anatomical shape and structure takes much longer, because transformation into normal structures must be more intensive. B. K.

SUMMARY

Bone plasty with massive solid homotransplants leads to various complications in 22 to 31 % of late results. Based on 249 experimental and 48 clinical observations of the bridging of large defects in bone with homotransplants of various shapes, the conclusion was reached that employment of massive solid homotransplants was not suitable, because it did not give a chance for restoring the normal intramedullary blood supply. Fragmenting a cortical homotransplant greatly facilitates access of blood vessels of the recipient bone to it, which correspondingly increases its blood supply. Longitudinal division of the cortical layer of a tube-shaped transplant, using a saw and preserving its anatomical shape gave the best results in both animal experiments and patients.

RÉSUMÉ

Aspects comparables de l'utilisation des autogreffes libres et pédiculées en encastrant des défauts segmentaires sur les os longs

G. I. Lavrishcheva, M. G. Grigoriev, A. A. Abakarov

La plastie osseuse aux autogreffes libres et massives appliquées longtemps après la blessure amène de différentes complications dans 22 à 30 % des cas. Sur la base de 249 observations expérimentales et 48 observations cliniques des grands défauts des

os encastrés à l'aide d'autogreffes en formes variées, les auteurs arrivent à la conclusion que l'utilisation des autogreffes libres et massives n'est pas de pleine valeur, parce qu'elle ne donne pas la possibilité de restituer la circulation intreosseuse du sang. L'autogreffe corticale fragmentée facilite considérablement l'accès des vaisseaux sanguins du lit récipient ce qui augmente rélativement le volume de la prolifération osseuse. C'était la coupe longitudinale de la couche corticale de l'autogreffe de l'os long qui — en servant se forme anatomique — a donné les meilleurs résultats de la plastie appliquée soit expérimentalement, soit par le mode clinique.

ZUSAMMENFASSUNG

Vergleichbare Aspekte der Anwendung gespalteter und nichtgespalteter Homotransplantate bei der Überbrückung grosser Segmentdefekte der langen Knochen

G. I. Lawrischtschewa, M. G. Grigorjew, A. A. Abakarow

Die unter der Anwendung massiver nichtgespalteter Homotransplantate spät nach der Verletzung durchgeführte Hautplastik führt in 22 bis 30 % aller Fälle zu verschiedenen Komplikationen. Auf Grund von 249 experimentellen und 48 klinischen Beobachtungen bei der Überbrückung grosser Knochendefekte mit Homotransplantaten verschiedener Formen kamen die Autoren zum Beschluss, dass die Anwendung massiver nichtgespalteter Homotransplantate nicht vollwertig ist, da sie nicht ermöglicht, den normalen Blutkreislauf in den Knochen wiederherzustellen. Fragmentiertes Kortikalishomotransplantat erleichtert wesentlich den Zugang der Blutgefässe aus dem Empfängerbett, wodurch das Volumen der Knochenproliferation relativ vergrössert wird. Längliches Durchfeilen der Kortikalisschicht des langen Knochens beim Beibehalten seiner anatomischen Form gab beste plastische Ergebnisse sowohl bei experimenteller als auch klinischer Applikation.

RESUMEN

Aspectos comparables del empleo de transplantes autotópicos libres y con pedículo al encastrar defectos segmentales grandes de los huesos largos

G. I. Lavrichtcheva, M. G. Grigoryev, A. Abakarov

La osteoplastia por medio de trasplantes autotópicos libres y masivos aplicados largo tiempo después de haber sida hecha la herida conduce a varias complicaciones en 22 hasta 30 % de los casos. A base de 249 observaciones experimentales y 48 clínicas de los defectos grandes encastrados de los huesos largos mediante trasplantes autotópicos de varias formas los autores llegaron a la conclusión de que el empleo de los trasplantes autotópicos libres masivos no es de valor entero porque no ofrece posibilidad alguna de restituir la circulación de sangre interósea normal. El trasplante autotópico cortical fragmentado facilita considerablemente el acceso de los vasos sanguíneos del lecho recipiente, lo que relativamente aumenta el volumen de la proliferación ósea. Los mejores resultados de la plástica así experimental como en la aplicación clínica fueron acertados por cortar con la lima las capas corticales de los trasplantes autotópicos de los huesos largos en dirección longitudinal dejando a la vez la forma anatómica de los mismos intacta.

REFERENCES

1. **Abramov, Y. G.:** New Method of Shaping Ends of Tubeshaped Bones in Bridging Defects in Bones of Limbs, in the book: Problems of Traumatology, Orthopaedics and Blood Supply. Proceedings of Scientific Conference of the Gorky Institute. Gorky 1964, p. 17.

2. **Volkov, M. V.:** Plasty Using Homologous Bone Grafts in Children. Proceedings of First All-Union Congress of Traumatologists and Orthopaedic Surgeons. Moscow 1965, p. 414.

3. **Zatsepin, S. T., Makhson, N. Y., Kuzmina, L. P. and others:** Twelve-Year Experience with Homoplasty of Conserved Condyles in Bone Pathology, Proceedings of Fifth All-Union Scientific Conference on Transplantation of Organs and Tissues. Gorky 1970, p. 198.

4. **Korzh, A. A., Talyshinsky, R. R.:** Homoplastic Operations in Large Defects of Bones and Joints Proceedings of Scientific Session on Traumatology and Orthopaedics. Riga 1966, p. 94.

5. **Makhson, N. Y.:** Reconstructive Operations in Large Tumours and Similar Processes in Bone. Author's dissertation. Moscow 1970.

6. **Talyshinskyi, R. R., Zhmurko, L. I.:** Complications in Homoplasty of Large Bone and Joint Defects. Ortop. Travm. Protez., 7 : 10, 1968.

7. **Böse, M.:** Die Anwendung homo- und heterologer Knochenkonserven der Gewebebank in der Orthopädie. Beitr. Orthop. Traum., 10 : 581, 1867.

8. **Jaroš, M.:** Experience in Using Massive Homotransplants of Bones and Joints (in Czech), Bratisl. lek. Listy, 48, 8 : 470, 1967.

9. **Merle d'Aubigne, R.:** Diaphyso-Epiphysical Resection of Bone Tumors at the Knee. Operative Treatment of Bone Tumors. Third International Symp., Basel 1969, p. 87.

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RECONSTRUCTION OF CORNERS OF MOUTH AFTER RESECTION OF LOWER LIP

B. A. MANUYLENKO

After resection of the lower lip in cancer with employment of primary plasty according to Bruns at the same stage, technical difficulties arise in reconstructing the red margin of the lower lip, particularly in the regions of the corners of the mouth.

Because of considerable thickness of the lower lip reconstructed from buccal flaps of mucous membrane must be formed which, to a certain extent, exceed the dimensions of the skin flaps. These mucous membrane flaps can be formed disregarding the existing layout of incisions in the skin, because the mucous membrane can easily be shifted.

Suture of the flaps is started on the mucous membrane with knots tied on the oral surface. The following sequense of stiches can be variform. It is important that the flaps be of sufficient length and width, so that they can be sutured without tension in any order. In order to lessen disfigurement of the face in the zygomatic regions, the skin incision at the apices of flaps is carried out at a rather sharp angle, which permits suturing the wound edges without forming cones, and disproportions between the prominent zygomatic regions and the hollow cheeks are somewhat smoothed over. Suturing the mucous membrane to the skin in the regions of the corners of the mouth be carried out without tension which then leads to the sutures cutting through and the wound healing by second intention.

For reconstruction of the corners of the mouth, the author uses the lateral parts of the red margin of the upper lip. The angular suture in joining the upper lip with the cheek is laid in the skin of the upper lip at a distance of 0.7—1.0 cm from the red margin depending on the elasticity of the upper lip which is then sutured to the angular incision formed by transposition of the flaps into the defect left after resection of the lower lip. This results in a "surplus" of red margin of the upper lip forming at its lateral edge, which is of a triangular shape with its base facing the reconstructed corner of the mouth and its apex in the region, where the sutures of skin and mucous membrane meet on the

reconstructed lower lip. Shortening of the upper lip and narrowing of the oral fissure does not occur, because the "surplus" of red margin of the upper lip has come into appearance on account of vertical extension of the upper lip. For the sake of instructivness, the diagram shows the red margin already reconstructed without suture of the mucous membrane in the oral vestibule and on the skin.

The method is based on the principle of forming a Filatov pedicle flap together with transposing a triangular flap at the base of the former. Six patients were operated on by the method described above. This principle of operation may not only be employed in upper-lip plasty according to Bruns, but also in other operations. The edge of red margin of the upper lip must be mobilized together with the skin, using a small additional incision. The actual sense of the operation lies in the transposition of red margin of the upper lip to the reconstructed corners of the mouth. The postoperative period was uneventful in the above six patients. They were able to open their mouths earlier after operation and without the danger of the sutures cutting through at the corners of the mouth.

In the available literature, the author did not find a description of this detail of the operation in resection of the lower lip. Plasty by the above method

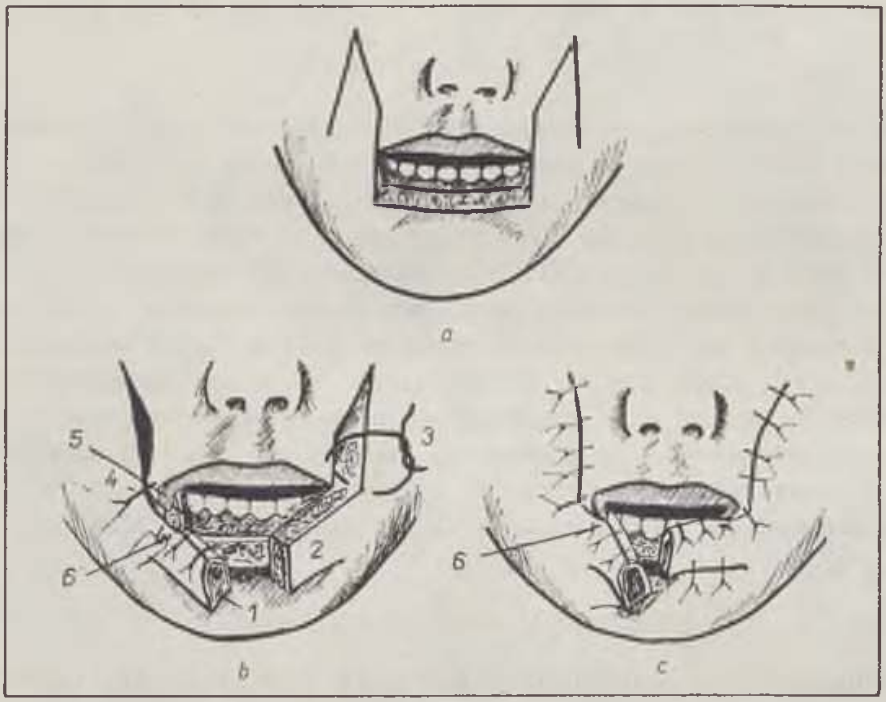

Diagram of Reconstruction of Corners of Mouth a) Lower lip has been resected; — b) formation of buccal flaps (1 and 2) swung by 90^0 and transposed to defect in lower lip. Angular suture (3) laid to skin of upper lip above red margin in the angle of incision formed by transposition of flap from cheek to defect in region of lower lip. Angular incision (4) tied. „Surplus" of upper lip red margin of triangular shape (5) with its base lying in reconstructed corner of mouth and its apex at site of contact (6) between sutures of skin and mucous membrane (this suture is an intracutaneous one); c) reconstructed corners of mouth

gives good cosmetic and functional results without necessitating any additional or corrective operations, and this is the reason, in the author's opinion, why it deserves notice. B. K.

SUMMARY

After resection and plastic reconstruction of the lower lip according to Bruns, the author uses the lateral parts of red margin of the upper lip. The angular incision and suture between the upper lip and the cheek is laid in the skin of the upper lip at a distance of 0.7—1.0 cm from the red margin and the lip is stitched to the angular incision which appears after formation of the flap in the region of the resected lower lip. This "surplus" of red margin of the upper lip is gained at its lateral edge in the shape of a triangle whose base lies in the reconstructed corner of the mouth and its apex in the region, where the sutures of skin and mucous membrane of the reconstructed lower lip meet. Six patients were operated on with good functional and cosmetic results. The method avoids tension in the wound and cutting through of the sutures at the mounth. It heals by first intention.

RÉSUMÉ

Reconstruction des commissures après la résection de la lèvre inférieure

B. A. Manuylenko

Pour une reconstruction des commissures après la résection de la lèvre inférieure, on utilise selon Bruns le bord extérieur de la partie rouge de la lèvre supérieure. On fait la suture d'angle sur le lèvre supérieure en anjoutant la lévre supérieure à la face 0,7—1,0 cm au-dessus du bord de la partie rouge et on coud la lèvre dans l'angle de cette incision. Celui-ci se forme après le déplacement du lambeau coupé de la région résequée de la lèvre inférieure. Ainsi, on obtient "une abondance" de la matière rouge de la lèvre supérieure en forme d'un triangle se dirigeant vers le bord extérière qui a sa base dans la commissure nouvelle formée, tandis que son sommet atteint la région où les sutures de la peau et de la muqueuse de la lèvre inférieure reconstruite touchent l'une l'autre. De cette manière on a opéré six malades avec un bon résultat fonctionnel et cosmétique. Cette méthode empêche le tension et la coupure des sutures dans la région de la commissure. La cicatrisation se fait par première intention.

ZUSAMMENFASSUNG

Wiederherstellung der Mundwinkel nach Resektion der Unterlippe

B. A. Manuilenko

Zur Wiederstellung der Mundwinkel nach der Resektion der Unterlippe mit Plastik nach Bruns benutzt man den äusseren Rand der Röte der Oberlippe. Die Winkelnaht bei der Sutur der Oberlippe zur Wange erfolgt an der Oberlippe 0,7—1,0 cm oberhalb des Randes der Röte und die Lippe näht man in den Inzisionswinkel, der sich nach der Verlegung des aus dem Bereich der resezierten Unterlippe ausgeschnitten Lappens bildet. Dadurch gewinnt man „Überschuss" an Röte der Oberlippe in Dreieckform am äusseren Rande, der sich mit seiner Base in dem neugebildeten Mundwinkel ausbreitet.

und mit seinem Gipfel in eine Gegend eingreift, wo sich die Nähte der Haut und Schleimhaut der wiederhergestellten Unterlippe berühren. Auf diese Weise wurden 6 Kranke mit funktionell und kosmetisch gutem Ergebnis operiert. Dieses Verfahren verhütet das Strecken und Durchschneiden der Nähte im Mundwinkel. Die Wunde heilt primär.

RESUMEN

Reconstrucción de las comisuras después de una resección del labio inferior

B. A. Manuilenco

Para la reconstrucción de las comisuras después de una resección del labio inferior con plástica según Burns se usa el margen exterior de la parte rubra del labio superior. Al suturar el labio superior a la cara la sutura angular se hace en el labio superior de 0,7—1,0 cm sobre el margen de la parte rubra y el labio se cose al ángulo de la incisión que se forma después de la trasladación del lóbulo recortado de la región del labio inferior resecado. Así se gana un „sobre" de la masa rubra del labio superior en la forma de un triángulo en el margen exterior que por su base se extiende en la comisura nuevamente creada de la boca y con su vértice alcanza a la región donde las suturas de la piel y de la mucosa del labio inferior reconstruido tienen contacto una a la otra. Seis pacientes fueron operados de esta manera con resultado bueno funcional y cosmético. Este método antecede el estirar y cortar las suturas en la comisura de la boca. La herida cicatriza de primera intención.

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APPRAISAL OF PROGNOSTIC SIGNIFICANCE OF VARIOUS FACTORS IN THE RESULTS OF AUTOTRANSPLANTATION OF SKIN IN BURNED PATIENTS

A. A. SHALIMOV, V. S. GENES, D. Y. PEKARSKYI, S. N. NODEL
A. A. NIKOLAYEVSKYI

In the prognosis of the outcome of burns sickness mathematical methods are increasingly employed in recent years (Gubler et Polonskyi, 1962; Genkin et Gubler, 1964; Vishnevskyi et al., 1963, 1967 and 1971; Gubler, 1965; McCoy et al., and others).

The method of mathematical prognosis of the outcome of skin autotransplantations in patients with burns, as elaborated by Shalimov et al. (1970) proved rather difficult in some cases, because it usually required data concerning all 19 factors. This is why the authors using the method of successive statistical analysis of Wald (1960) in the modification of Genkin et Gubler (1964) set themselves the task to give a quantitative appraisal of the prognostic significance of various factors for the outcome of skin autotransplantations in patients with burns and draw up a table for the enumeration of the prognosis of surgical results, which would be more suitable for practical usage.

The following 20 different factors were investigated: Sex, age, thermic agent, area of deep burn, erythrocyte count, level of haemoglobin in blood, leucocyte count, absolute number of young neutrophils and that of mature neutrophils, lymphocytes, level of protein in blood serum, location of burn, clinical characteristics of wound, variety of microflora in the wound, pathogenity of microflora, cytological type of wound, catalytic number of wound, days after operation, repetition of operation, area of skin transplant.

The dependence of the result of an autotransplantation of skin on the significance of each factor and their totality were studied in 300 operations. In this way the informativity measure of each factor was investigated.

The results of observations were analysed and divided into three groups:

1. Transplanted skin has taken up to 25 % = poor result.

2) Transplanted skin has taken from 25 to 75 % = satisfactory result.

3) Transplanted skin has taken more than 75 % = good result.

For the significance of each factor diagnostic coefficients and their informativity were calculated. The diagnostic coefficients (DC) of each indicator were calculated using the following formula:

$$DC = 10 \lg \frac{P\ (x_{ij}/A_1)}{P\ (x_{ij}/A_2)} \qquad (1)$$

where x_{ij} = j^{th} sign (diapasone) of i^{th} factor; P (x_{ij}/A_1) = conditonal probability of sign x_{ij} in the presence of the reslt A_1. This quantity equals the frequency of the given sign in condition A_1. P(x_{ij}/A_2) is analogous.

After calculating the diagnostic coefficients for each factor the former were entered in the special table according to the order of diminishing informativity of signs. The informativity of factor I (x_i) was determined according to the formula:

$$I\ (x_i) = \Sigma_j DC\ (x_{ij})\ [P\ (x_{ij}/A_1) - P\ (x_{ij}/A_2)]. \qquad (2)$$

As was shown by the calculation of informativity, the factors "sex" and "pathogenity of microflora" have no influence on the outcome of skin autotransplantation and were therefore omitted in the following elaborations.

The prognosis is determined by summation of the diagnostic coefficients in the order of their distribution in the table up to the sum of some sign called the threshold coefficient.

The significance of the diagnostic threshold coefficients DC I and DC II depends on the exactitude of the method and is calculated according to the following formulae:

$$\text{Threshold DC I} = 10 \lg \frac{\alpha}{1-\beta}, \text{ threshold II} = 10 \lg \frac{\beta}{1-\alpha} \qquad (3)$$

where α and β equal the set percentage of error in prognosticating: α = error of first type, i.e. making a good prognosis when reaching the second result; β = error of second type, i.e. making a satisfactory prognosis when reaching the second result.

From the medical point of view α and β are considered equal and at the exactitude of the method of 85 % amount to 0.15: $\alpha = \beta = 0.15$. Calculation of the threshold DCs as carried out according to the above formulae showed that threshold DC I = +7.5 and threshold DC II = —7.5.

Tab. 1 of diagnostic coefficients, drawn up by calculating the informativity of signs and the threshold values, contains two alternatives reflecting in their sum three possible results of skin transplant incorporation. The prognosis is made after summing up the diagnostic coefficients at the same time according to two alternatives. Summing up is continued up to achieving one of the thresholds. After that one of the alternatives is considered determined to one or the other side. Depending on which of the sums and which threshold have been achieved, the following conclusion may be reached:

1) Alternative 1. Threshold +7.5. All procedures interrupted: the prognosis is good.

Tab. 1. Differential-Prognostic Table

Consec. number	Factors	Significance of factors	Designation	Diagnostic coefficients alternative I A_1, A_2 A_3	Diagnostic coefficients alternative II A_1, A_2 A_3
1	Repeated Operations	first	$X_{1.1}$	0	0
		second	$X_{1.2}$	−1.5	−0.8
2	Area of deep burn (in per cent)	Up to ten	$X_{2.1}$	+1.4	−1.3
		from 10 to 20	$X_{2.2}$	−2.7	+3.3
		from 20 to 30	$X_{2.3}$	−2.6	+2.4
		over 30	$X_{2.4}$	−4.5	+0.9
3	Thermic agent	Boiling water	$X_{3.1}$	+3.1	+1.8
		Other hot fluids	$X_{3.2}$	+2.2	−1.7
		Vapour	$X_{3.3}$	+1.4	+1.3
		Contact	$X_{3.4}$	+1.3	+2.0
		Electric	$X_{3.5}$	−0.6	+0.1
		Flame	$X_{3.6}$	−0.9	+0.4
		Tar	$X_{3.7}$	−1.9	−1.9
		Metal	$X_{3.8}$	−1.7	+1.2
4	Days after operation[1])	Primary	$X_{4.1}$	+2.2	+1.2
		Early	$X_{4.2}$	+2.2	+1.1
		Secondary	$X_{4.3}$	+1.3	+1.0
		Late	$X_{4.4}$	−1.1	−0.9
5	Clinical type of wound[1])	I	$X_{5.1}$	+3.3	+2.2
		II	$X_{5.2}$	+2.1	+1.4
		III	$X_{5.3}$	−0.5	+1.6
		IV	$X_{5.4}$	+1.3	+2.0
		V	$X_{5.5}$	+0.2	+0.3
		VI	$X_{5.6}$	−0.6	+0.4
		VII	$X_{5.7}$	−0.7	+0.1
6	Number of leucocytes (in 1000 per 1 ml blood)	up to 8	$X_{6.1}$	+3.9	+2.3
		from 8 to 10	$X_{6.2}$	+2.2	+1.4
		from 10 to 13	$X_{6.3}$	−0.9	+1.2
		over 13	$X_{6.4}$	−1.9	−1.0
7	Absolute number of rod neutrophils (in 1 ml blood)	up to 150	$X_{7.1}$	+3.1	+1.3
		from 150 to 500	$X_{7.2}$	+2.3	+0.8
		from 500 to 1000	$X_{7.3}$	−0.2	+0.4
		over 1000	$X_{7.4}$	−1.1	−0.6
8	Absolute number of polymorphonuclear neutrophils (in 1 ml blood)	up to 5000	$X_{8.1}$	+3.2	−0.8
		from 5000 to 8000	$X_{8.2}$	+1.3	+0.7
		from 8000 to 130.000	$X_{8.3}$	−1.6	+1.0
		over 130.000	$X_{8.4}$	−2.6	−2.4
9	Absolute number of lymphocytes (in 1 ml blood)	up to 1500	$X_{9.1}$	+4.1	+2.4
		from 1500 to 3000	$X_{9.2}$	+2.3	−0.6
		from 3000 to 4500	$X_{9.3}$	−1.2	−1.7
		over 4500	$X_{9.4}$	−1.7	−1.8
10	Catalatic number of wound[1])	up to 2.0	$X_{10.1}$	+3.9	+2.3
		from 2.0 to 3.5	$X_{10.2}$	+2.2	+0.4
		from 3.5 to 5.0	$X_{10.3}$	−1.1	−1.2
		over 5.0	$X_{10.4}$	−1.8	−2.8

Tab. 1 — Cont.

Consec. number	Factors	Significance of factors	Desig-nation	Diagnostic coefficients	
				alter-native I A_1, A_2 A_3	alter-native II A_1, A_2 A_3
11	Area of skin transplant (in cm²)	up to 200	$X_{11.1}$	+2.4	+1.4
		from 200 to 500	$X_{11.2}$	0	+2.0
		over 500	$X_{11.3}$	−1.2	−2.5
12	Age	up to 14 years	$X_{12.1}$	+1.1	+0.3
		from 14 to 60	$X_{12.2}$	+0.4	+1.3
		over 60	$X_{12.3}$	−1.1	−2.0
13	Location of burn	head	$X_{13.1}$	−0.8	−0.7
		trunk	$X_{13.2}$	+1.2	−0.6
		upper limbs	$X_{13.3}$	+1.4	+0.3
		hand only	$X_{13.4}$	+0.1	−0.3
		lower limbs	$X_{13.5}$	+1.4	+1.2
		foot only	$X_{13.6}$	+0.4	+0.8
		buttocks and perineum	$X_{13.7}$	−2.1	−1.1
		various parts	$X_{13.8}$	+0.9	−1.2
14	Cytological type of wound[1])	D.N.	$X_{14.1}$	−1.5	+1.4
		D.V.	$X_{14.2}$	+0.4	−0.1
		D.N. - D.V.	$X_{14.3}$	+1.2	+0.7
		R-1	$X_{14.4}$	+2.3	+1.8
		D.V. - R-1	$X_{14.5}$	+1.4	−1.6
15	Total protein in blood serum (in gr. per cent)	up to 6.0	$X_{15.1}$	−0.7	−0.6
		from 6.0 to 7.2	$X_{15.2}$	+0.4	+0.6
		over 7.2	$X_{15.3}$	+2.2	+1.3
16	Number of erythrocytes (in millions per 1 ml blood)	up to 3.0	$X_{16.1}$	−0.6	+1.2
		from 3.0 to 4.5	$X_{16.2}$	+0.3	+0.9
		over 4.5	$X_{16.3}$	+1.3	−1.4
17	Haemoglobin content in blood (in units)	up to 60	$X_{17.1}$	−1.1	+1.1
		from 60 to 80	$X_{17.2}$	+0.4	−0.2
		over 80	$X_{17.3}$	+1.2	+0.2
18	Variety of microflora in wound	Staphylococcus	$X_{18.1}$	+1.4	−2.0
		Staphylococcus plus b. pyocyaneus	$X_{18.2}$	−1.6	+2.4
		Streptococcus	$X_{18.3}$	−0.8	+0.1
		B. pyocyaneus	$X_{18.4}$	−1.3	−1.6
		Proteus	$X_{18.5}$	+1.4	+2.4
		Staphylococcus plus proteus	$X_{18.6}$	+1.3	−0.1
		Microbial associations	$X_{18.7}$	−0.6	+1.0
		Microbial associations	$X_{18.7}$	−0.6	+1.0

[1]) Ortop. Travm. Protez. 12 : 65, 1968

Tab. 2. Corresponding Results of Skin Autotransplantations with their Mathematical Prognostication

Prognosis prior to operation	Number of operations	Actual result observed			Percentage of correct prognosis
		good	satisfactory	poor	
Good	83	76	3	4	92±3
Satisfactory	17	1	14	2	82±10
Total	100	77	17	6	90±3

2) Alternative 1. Threshold —7.5. Conclusion: Prognosis is not good, either poor or satisfactory.

For alternative 2 the procedure continues.

3) Alternative 2. Threshold +7.5. Conclusion: satisfactory prognosis. Procedure is discontinued.

4) Alternative 2. Threshold —7.5. Conclusion: poor prognosis. Procedure is interrupted.

If an indefinite result is achieved after using all information for one or both alternatives, i.e. none of the threshold sums is achieved, an additional set of information about the patient is required or a prognosis may be made which is less exact.

The diagnostic coefficients of the table were confirmed in 100 operations of autotransplantation of skin in 75 patients in whom the surgical results were calculated beforehand by the method described above. These results are registered in Tab. 2.

Out of the 100 operations in which the results of skin autotransplantation had been calculated beforehand, ten showed differing results from those foreseen by the prognosis: In six plasties, disregarding the favourable prognosis, the transplants underwent lysis. On the other hand, the result of one plasty exceeded expectation. The results of three plasties partly did not coincide with the prognosis. In the remaining 90 cases the results coincided with the prognosis: in 14 the result was satisfactory out of 17 cases prognosticated in this way and 76 results were good out of 83 prognosticated.

Thus confirmation of the mode of prognostication as carried out in 100 autotransplantations of skin executed after preliminary prognostication of their results has shown that the measure of inexactitude does not differ from the calculated one and equals the mean for good and satisfactory prognoses in 90 ± 3 %.

The most important indicator of efficacy of the table is the number of factors according to which the prognosis is made, i.e. the number of steps in

prognostication which corresponds to the first eight to nine factors in most cases (Tab. 1) out of the 18 possible ones.

Employment of mathematical methods facilitates carrying out the appraisal of the prognostic significance of the various general and local factors for the outcome of skin autotransplantation in patients suffering from burns.

B. K.

SUMMARY

Based on the results of 300 autotransplantations of skin in patients suffering from burns an appraisal of the prognostic significance of 20 different clinical and laboratory indicators was carried out and a special table has been drawn up according to the calculated prognosis of operations using the scheme of successive analysis of Wald for three possibilities (good, satisfactory and poor result). Confirmation of the method on 100 new operations has shown that the prognosis well corresponded to the results with an exactitude of 85 %.

RÉSUMÉ

Evaluation de l'importance prognostique des différents facteurs dans les résultats des autogreffes cutanées chez les brûlés

A. A. Shalimov, V. S. Genes, D. J. Pekarskii, S. N. Nodel
A. A. Nikolayevskyi

Selon les résultats de 300 autogreffes cutanées sur les malades avec lés brûlures, on a fait une évaluation de l'importance de 20 différents indices cliniques et laboratoires et on a établi une table spéciale des prognostics prévus des opérations selon le schème de l'analyse successive de Wald pour trois éventualités (résultat bon, satisfaisant, mauvais). L'évaluation de cette méthode a démontré dans 100 opérations suivantes que le prognostic avait été conforme au calcul d'exactitude de la méthode en 80 p. 100.

ZUSAMMENFASSUNG

Beurteilung der prognostischen Bedeutung verschiedener Faktoren bei den Ergebnissen der Hautautotransplantationen bei Verbrannten.

A. A. Schalimov, V. S. Genes, D. J. Pekarskiy, S. N. Nodel
A. A. Nikolaievskiy

Nach Ergebnissen von 300 Hautautotransplantationen bei Kranken mit Verbrennungen wurde die prognostische Bedeutung von 20 verschiedenen klinischen und Laborkriterien beurteilt und eine spezielle Tabelle der berechneten Operationsprognosen nach dem Schema der Progressivanalyse von Wald für drei Möglichkeiten (gutes, befriedigendes und schlechtes Ergebnis) zusammengestellt. Die Auswertung der Methode zeigte bei 100 neuen Operationen, dass die Prognose mit der berechneten Genauigkeit der Methode in 85 % aller Fälle gut übereinstimmte.

RESUMEN

Evaluación de la importancia prognóstica de varios factores en los resultados de transplantes autotópicos de la piel en los quemados

A. A. Shalimov, V. S. Guenes, D. J. Pekarskii, S. N. Nodel
A. A. Nikolaevskii

Según los resultados de 300 transplantes autotópicos de la piel en los enfermos con quemaduras fue hecha una evaluación de la importancia prognóstica de 20 varios índices clínicos y laboratorios y establecida una tabla especial de los prognósticos previstos de operaciones según el esquema de un análisis sucesiva de Wald para tres eventualidades (resultado bueno, satisfactorio, malo). La evaluación del método mostró que la prognosis correspondía bien en 85 % al cálculo de la exactitud del método.

REFERENCES

1. **Wald, A.:** Successive Analysis, Moscow, 1960.

2. **Vishnevskyi, A. A., Braines, S. N., Shraiber, M. I., Brailovskyi, V. L., Kuchina, Y. V., Panova, Y. M.:** Cybernetic Method of Determining Severity of Condition and Prognosis in Burns Sickness. Exper. Chir. Anest., 4 : 3, 1963.

3. **Vishnevskyi, A. A., Braines, S. N., Shraiber, M. I., Brailovsky, V. L., Kuchina, Y. V., Panova, Y. M.:** A New Method of Prognosis in Free Skin Autotransplantation using the Algorhythm of Recognition in the Electron Computer. Exper. Chir. Anest., 2 : 68, 1967.

4. **Vishnevskyi, A. A., Schraiber, M. I., Braines, S. N., Brailovskyi, V. L., Lunts, A. L., Kuchina, Y. V., Rusakov, A. B., Yestrovich, Y. V.:** Prognostication of Autotransplantations in Burns Sickness using the Table Method. Exper. Chir. Anest., 2 : 3, 1971.

5. **Genes, V. S.:** Some Simple Methods of Cybernetic Procedures for Diagnostic and Physiological Investigations. Moscow 1967.

6. **Genkin, A. A., Gubler, Y. V.:** Employment of Successive Statistical Analysis for Differential Diagnosis and Utilization of the Method for Differentiating Two Forms of Burns Sickness. Employment of Mathematical Methods in Biology. Leningrad 3 : 174, 1964.

7. **Gubler, Y. V., Polonskyi, Y. Z., Genkin, A. A., Korytova, M. Y.:** Early Diagnosis of Forms of Burns Sickness using the Differential-Diagnostic Table. Exper. Chir. Anest., 5 : 17, 1964.

8. **Gubler, Y. V.:** Employment of Mathematical Methods and Computer Technique in the Diagnosis of War Wounds. Voy.-Med. Zh., 9 : 12, 1965.

9. **Shalimov, A. A., Pekarskyi, D. Y., Nodel, S. N., Nikolayevskyi, A. A.:** Prognostication of Results of Skin Autotransplantations in Patients with Burns. Ortop. Travm. Protez., 8 : 8, 1970.

10. **McCoy, I. M., Don, W. Wicksand, Lynch, I. B.:** Discrimination Function Probability Model for Predicting Survival in Burned Patients. J.A.M.A., 1203, 9 : 644, 1968.

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PLASTIC TREATMENT OF SCAR CONTRACTURES OF NECK WITH FILATOV PEDICLE FLAP IN CHILDREN

V. I. SHCHIPACHEVA

The treatment of scar contractures in the neck of children is very difficult. Local plasty after resection of large scars is impossible. Free transplantation of full-thickness skin grafts gives fully satisfactory early results, two to three years after operation, however, contractures recur. In severe contractures, when the scars occupy the anterior and lateral aspects of the neck and are of a keloid character, the best material for a plasty is skin of a Filatov flap with a thick layer of subcutaneous fat. Such skin does not undergo scar contracture. Plasty using a Filatov pedicle flap for operation on the neck of adults has been described in the literature by many auhors (Khirov, 1954; Mukhin, 1961; Mukhin et Mamonov, 1966; Mamonov, 1966, and others). The author, however, did not find any report in the literature on using Filatov flaps in children.

Burns in the face are frequently combined in children with burns on the neck, the chest and upper limb. The scars developing after IIIb and IV degree burns are frequently of a keloid character. In these children, the chin is usually pulled to the chest by scars, the lower lip is ectropic, the teeth are also everted and may even reach a horizontal position. Apart from the severe disfigurement, the patient has trouble in the intake and mastication of food, in breathing and speech, and saliva keeps dripping out of the mouth, which leads to dehydration of the patient and maceration of the surrounding skin. The pull of massive scars also leads to forced position of the head and trunk which leads to severe secondary deformation not only of the facial skeleton, but also of the cervical spine. Thus, in order to prevent disfigurement and deformation and to restore the affected functions, surgical treatment should be started as soon as possible.

Af the Maxillo-Facial Department plasty in the facio-maxillary region using a Filatov pedicle flap was carried out in 114 children during the period between 1945 and 1973. In six of them, the operation was indicated for scar contracture of the neck. The children were of an age between four and twelve years. They

had suffered burns, most of them by flames, at an age of three to eight, only one child had suffered corrosion from sulphuric acid. In this patient, scars had developed on the head, the face, the neck and the chest. After resection of scars on the neck, two Filatov flaps had to be employed. The flaps were usually formed on the abdomen, their mean size was 17×8 cm. Even in small children large pedicle flaps were formed, because the skin underneath them could easily be sutured due to its excellent elasticity of tissues. One month after training, one pedicle was transposed to the hand and the upper limb immobilized in a plaster cast. The children well tolerated the forced position due to immobilization of the limb and joint contractures never developed, and even in those cases, where certain limitation of joint movements was found after removal of the plaster cast, this passed after two to three heat applications. The third and most crucial stage was transposition of the other pedicle to the neck near the edge of the scar. The limbs had to function in the new position of the second plaster cast. After this stage, special care had to be taken to prevent the patient from tearing off the pedicle. Six to eight weeks afterwards the fourth stage of the plasty was carried out, which consisted in the following: Under local anaesthesia the pedicle was separated from the hand and left "pending" for the time being, while the upper limb was carefully brought down. Then, under general anaesthesia, all scars on the neck were excised, the head reduced to normal position, and after exact control of bleeding the pedicle was spread out over the area, its subcutaneous fat partly excised and the thus formed skin sheet laid onto the skin defect, fixed to the underlying tissue with a few catgut stitches, and the skin edges were sutured with silk. Three to four thin rubber drains were introduced between stitches. During operation the patient received a blood transfusion and after operation penicillin was administered. In four out the six patients, large areas developed after excision of the scars which could not be covered with one pedicle graft and split skin grafts had to be employed for the wound on the chest. After removal of stitches, remedial exercises were prescribed and tissue therapy was continued by injection of viterous or aloe and recently of pyrogenal. Healing proceded uneventfully in all children and the results were fully satisfactory. The late results were checked up in all six children: in four of them after nine years, in one after seven years and in another one after one year. The skin of the Filatov flap which had taken many years previously, showed a normal appearance and a well developed subcutaneous tissue layer. It was soft, elastic and could be gathered in folds. Also enlargement of the skin of the flap was observed, which was proportionate to the child's growth. Movements of the head, bending backward and to the sides, could be carried out to full extent. All patients were fully satisfied with the results of the treatment.

Two cases are presented here for illustration:

Patient S., a boy aged nine, was admitted to the Institute on Jan. 7, 1963, complaining of difficult head movements (Figs. 1 and 2). In Nov., 1960, he spilled a bottle of concentrated sulphuric acid on himself, his sister and brother. The younger brother died immediately at the site of accident. The suffering

children were treated for a long time in a regional hospital and afterwards transferred to the Maxillo-Facial Dept. of the Institute. The child's head was sharply bent and pulled towards the chest. Keloid scars occupied the anterior and lateral aspects of the neck, the chest and the back. Large parts of the hairy surface of the head on the right side was covered with scars and in the region of the vertex there was a granulating wound measuring 15×5 cm. At the back of the neck there was also a wound measuring 6×2 cm. The lower lip was pulled down and the right auricle was missing. Side movements and reclination of the head were greatly limited. On Jan. 24, 1963, operation was carried out: Under local anaesthesia a Filatov pedicle flap, measuring 20×7 cm, was formed on the left side of the abdomen. Healing was uneventful. The child was discharged home for rest. On Aug. 6, 1963, another operation was carried out: A second pedicle flap, measuring 17×8 cm, was formed on the right side of the abdomen. Then, the flaps were transferred to the neck via the left hand, one of which was implanted there with both pedicles, the other only with one. On Feb. 25, 1964, the main part of the plasty was performed. Under general anaesthesia the pedicle was separated from the hand as well as one of the

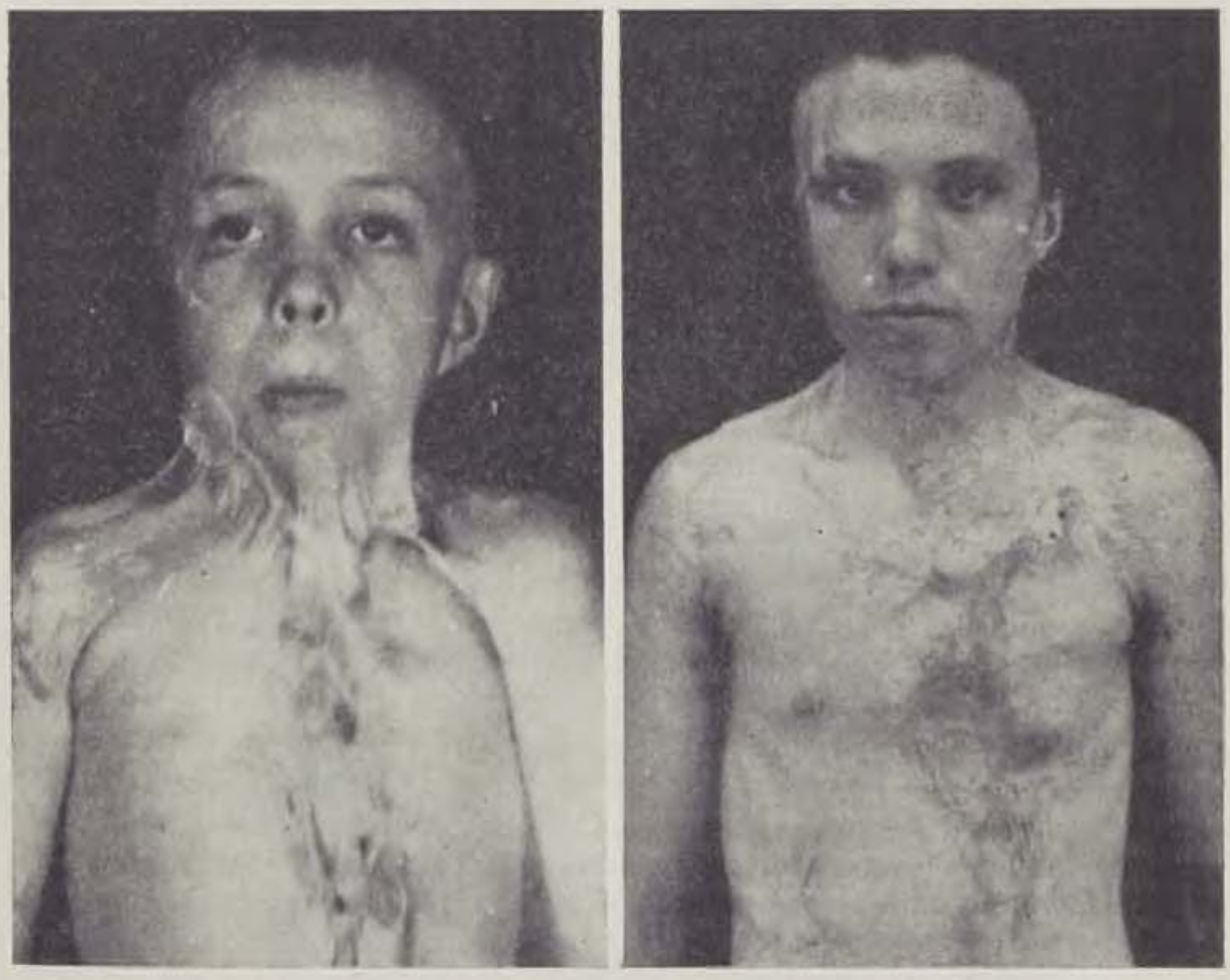

Fig. 1. Patient S. Scar contracture of neck. — Fig. 2. Same patient nine years after plasty, when two Filatov pedicle flaps had been used

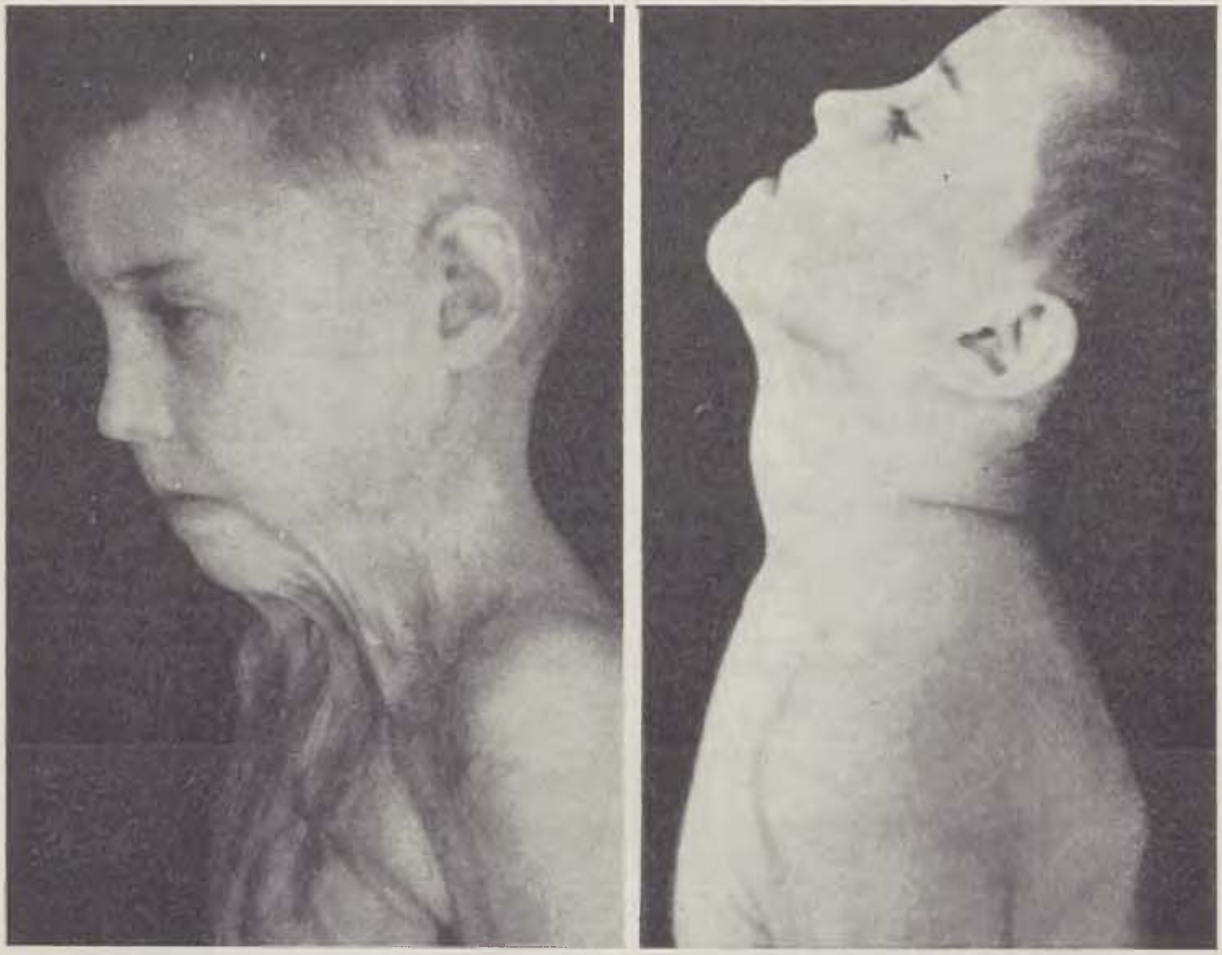

Fig. 3. Patient B. Scar contracture of neck after burns. — Fig. 4. Same patient three years after plasty with Filatov pedicle flap

pedicles of the flap which had been implanted on the neck with both pedicles. The pedicles were moved to the side. The scars on the anterior and lateral aspects of the neck were divided by a transverse incision of 22 cm. The scar tissue was excised completely and the head reduced in a position of hyperextension. The wound which resulted from excision and the manoeuver of the head measured 25×15 cm. Meticulous control of bleeding was carried out. The flaps were spread out, their fatty tissue partly excised they were placed transversely in a way that one flap covered the skin defect in the submandibular region, while the other that on the anterior aspect of the neck. The wound surface on the anterior aspect of the chest, measuring 8×9 cm, was covered with a free split skin graft. During operation 400 ml of blood was transfused and after operation penicillin was administered. The flaps took by first intention and the child was discharged in good condition. Later several corrective operations and reconstruction of the auricle were performed at the Leningrad Institute of Traumatology and Orthopaedics. On check-up nine years later it was found: The contours of the neck were good and head movements free. The skin of the neck did not differ in colour from that of the face; it was soft, elastic, could be moved over the underlying tissue and gathered in

folds. Under it a straight layer of subcutaneous fat could be ascertained. With regard to the patient's growth (from 9 to 18 years) the skin of the neck, which had been replaced by that of the pedicle flaps, had also grown in all directions by 1.5 times. The patient is satisfied with the result of treatment, has passed his ten classes of basic education and has been admitted to a polytechnical institute.

Patient B., a girl aged six, wad admitted to the Maxillo-Facial Department of the Institute on Nov. 23, 1962, because of scar contracture of the neck, large scars on the chest and abdomen (Figs. 3 and 4). With five she had been burned by flames. On admission, the anterior aspects of the neck, the chest and the abdomen were occupied by massive scars. Head movements in the sense of reclination and sideward bending were greatly limited. On Dec. 13, 1962 operation was carried out: Under general anaesthesia a Filatov pedicle flap was formed on the anteroleft aspect of the abdomen, measuring 18×7 cm. The wounds healed by first intention. Then the flap was transferred to the healthy tissues of the neck via the hand. On June 18, 1963, the main operation was performed: Under endotracheal general anaesthesia, the pedicle of the flap was separated from the hand and left pending. The scars were excised on the anterior aspect of the neck, the head put into normal position, which led to formation of a wound surface measuring 14×12 cm; finally bleeding was controlled. The pedicle flap was spread out, and its subcutaneous fat partly excised, laid out over the wound in a transverse position and sutured. Healing proceded by first intention. The patient was checked up three years and then nine years after operation. Her neck is well formed, its skin soft, elastic, but less pigmented than the surrounding skin. With the child growing. the skin of the flap has also grown larger. Head movements are free. The patient is satisfied with the result of the operation. She has completed eight classes of her basic education.

B. K.

SUMMARY

The treatment of scar contractures in the neck represents a difficult task which has not yet been completely solved.

Scars in the face, the neck and the upper limb, which have developed as a result of IIIb to IV degree burns are of a keloid character and not only severely disfiguring, but also limit head movements, impede speech, facial movements, and the intake and mastication of food. In order to prevent secondary deformation of soft tissues and bones of the face from developing, surgical treatment should be started as soon as possible. In severe contractures in children, when the scars have occupied the anterior and lateral aspects of the neck, reaching into depths and are of a keloid character, skin plasty using one or even two Filatov pedicle flaps is indicated, according to the author's opinion. The flap is incorporated with one pedicle and at the final stage spread out, its subcutaneous fat partly excised, and then sutured to the wound in a transverse position. Such an operation was, carried out in six

children with fully satisfactory results. Late results have shown that the skin of the flaps incorporated on the neck grows in size in accordance with the child's growth.

RÉSUMÉ

Suppression des cicatrices rétractiles sur le cou des enfants à l'aide de plastie par le lambeau de Filatov

V. I. Chtchipatcheva

La suppression des cicatrices rétractiles sur le cou des enfants présente une tâche difficile qui n'a pas été totalement résolue jusqu'ici.

Les cicatrices sur la face, le cou et les membres supérieurs qui se développent après les brûlures du troisième et quatrième degré sont souvent du caractèr chéloïde. Celles-ci causent non seulement une déformation et restriction des mouvements de la tête, mais aussi une altération de la parole et mimique, de l'accueil et mastication des aliments. Pour empêcher le développement des déformations secondaires des tissus molles et osseux de la face, il faut les traiter chirurgicalement le plus tôt possible. Dans les cas de cicatrices rétractiles chez les enfants, quand les cicatrices occupent les surfaces antérieure et latérale du cou et pénétrant dans les couches profondes sont du caractère chéloïde, il faut, à l'avis de l'auteur, utiliser un ou deux lambeau de Filatov pour faire la plastie. Après avoir partiellement écarté le tissu adipeux, dans la dernière phase de la plastie, on répand le lambeau repris par un pédicule et on le coud dans la position transversale. De telle manière on a fait la plastie chez six enfants avec un résultat totalement satisfaisant. Les contrôles à long terme ont démontré que la peau reprise au cou s'augmente proportionnelement avec la croissance de l'enfant.

ZUSAMMENFASSUNG

Entfernung narbiger Kontrakturen am Hals bei Kindern durch Filatowlappenplastik

V. I. Schtschipatschewa

Die Entfernung der narbigen Kontrakturen am Hals bei Kindern stellt eine schwierige Aufgabe vor, die bisher noch nicht vollkommen gelöst worden ist.

Narben im Gesicht, am Hals und an der oberen Gliedmasse, die sich nach Verbrennungen des dritten und vierten Grades entwickeln, besitzen oft kelloiden Charakter und verursachen nicht nur Entstellung und Kopfbewegungseinschränkung, sondern auch Beeinträchtigung der Mimik, der Nahrungseinnahme und des Kauens. Damit die Fortentwicklung sekundärer Deformationen der Weich- und Knochengewebe des Gesichtes verhütet wird, muss möglichst frühzeitig chirurgische Behandlung eingeleitet werden. In Fällen von schweren Kontrakturen bei Kindern, wo die Narben die Vorder- und Seitenflächen des Halses umschliessen, erstrecken sich die Narben in die Tiefe und sind kelloid und es müssen nach der Ansicht der Autoren bei der Plastik ein oder zwei Filatowlappen benutzt werden. Den mit einem Stiel eingeheilten Lappen breitet man im letzten Stadium der Plastik nach partieller Fettgewebeentfernung aus nud näht ihn an die Wunde am Hals in Querstellung. Diese Plastik wurde bei sechs Kindern mit völlig zufriedenstellendem Ergebnis durchgeführt. Spätkontrollen haben gezeigt, dass sich die in den Hals eingeheilte Haut des Lappens proportionell mit dem Wachstum vergrössert.

RESUMEN

Remoción de cicatrices retráctiles en el cuello de los niños mediante una plástica con el lóbulo de Filatov

V. I. Shchipacheva

La remoción de cicatrices retráctiles en el cuello de los niños representa una tarea difícil que hasta ahora no ha sido resuelta.

Cicatrices en la cara, en el cuello y las extremidades superiores que se crean después de las quemaduras del tercero y cuarto grado tienen a menudo carácter quéloide y no solamente causan deformación y limitación de los movimientos de la cabeza, sino también alteración del habla, de la mímica, del recibo y de la masticación de los alimentos. Para prevenir el desarrollo de deformaciones secundarias de los tejidos blandos y tejidos óseos de la cara es necesario tratar quirúrgicamente lo más pronto. En los casos de cicatrices retráctiles graves en los niños cuando las cicatrices ocupan las superificies anteriores y laterales del cuello, las cicatrices alcanzan a las capas profundas y son de carácter quéloide, según la opinión de la autora es necesario emplear dos o tres lóbulos de Filatov en la plástica. El lóbulo adherido por un pedículo se extiende en el último estadio de la plástica después de ser privado del tejido adiposo parcialmente y está costurado a la herida en el cuello en posición transversal. Tal plástica fue performada en seis niños con un resultado totalmente satisfactorio. Los controles tarídos han mostrado que la piel del lóbulo adherida en el cuello se aumenta en proporción con el crecimiento del niño.

REFERENCES

1. **Butikova, N. I.:** Plasties Using Filatov Flaps in Reconstructive Operations on Children and Adolescents. Ortp. Travm. Protez., 11 : 49, 1962.

2. **Mamonov, A. G.:** Surgical Treatment of Contracture in Neck Using Filatov Pedicle Flap. Vestn. Chir., 11 : 31, 1966.

3. **Mukhin, M. V., Mamonov, A. G.:** Surgical Treatment of Scar Contractures in Neck. Vestn. Chir., 9 : 155, 1966.

4. **Mukhin, M. V.:** Treatment of Burns on Head, Face and Neck, and their Sequelae. Leningrad 1961.

5. **Mukhin, M. V.:** Treatment of Deep Burns on Neck and their Sequelae. Papers of Kirov Academy of Military Medicine. V 140 : 7, 1962.

6. **Khitrov, F. M.:** Plastic Coverage of Defects in Face and Neck with Filatov Pedicle Flap. Moscow 1954.

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SYSTEMIC EFFECTS OF BURNS ON BONE MINERAL METABOLISM

2. The Influence of General Anaesthesia

J. KOLÁŘ, A. BABICKÝ, B. BÍBR, R. VRABEC

In our previous papers (Kolář et al. 1971) some generalized aberrations of mineral metabolism in the skeleton of burned rats have been documented and their different intensity in male and female animals has been stressed (Kolář et al. 1974). Such differences prove the regulatory influence of sexual hormones on the course and intensity of these reactions. Previous investigations of radiaton-induced injuries (Kolář et al. 1965) also revealed the regulatory influence of the central nervous system on the course of such reaction. When a denervation of the whole extremity has been performed prior to the radiation insult, the conduction of painful irritations from the periphery to the central nervous system has been obstructed. In such cases the generalized answer takes a milder course starts later and is of shorter duration. It was not only a theoretical interest but also the needs of the clinical practice which have led us to solve the question whether also another suppression of painful perceptions would lower the whole-body metabolic response in burned animals.

METHODS

Both female and male adult Wistar rats (strain Konárovice) in the weight of 200 g respective have been used in our experiments. The animals have been narcotized with ether deeply enough that they have slept at least two to three minutes after the burn. A 1 per cent of body surface burn was caused beneath the patella of the right knee by putting an iron heated on 350 ^{0}C for five seconds on the skin. Parallel with burned animals healthy controls have been kept under the same conditions.

The burns healed within ten days without remarkable alteration of the general condition of the animals. There have also been no deaths during the experimental

Table. Statistical Evaluation of the Experimental Events

Parameter	Sex	Side	Days											
			2	4	8	14	21	28	35	42	49	56	63	70
d/w	male	b									<0.05			
		o										<0.05		
	female	b						<0.05						
		o											<0.01	<0.05
a/w	male	b							<0.01					
		o								<0.05				
	female	b		<0.05		<0.05						<0.05		<0.01
		o										<0.05		
d/a	male	b							<0.01	<0.05				
		o												
	female	b							<0.05					
		o							<0.05					
Ca	male	b							<0.01					
		o							<0.05					
	female	b										<0.05		<0.01
		o										<0.05		
Ca/w	male	b	<0.05							<0.05				<0.01
		o										<0.05		
	female	b									<0.05		<0.05	<0.05
		o												
Ca/a	male	b					<0.05		<0.05					
		o												
	female	b												
		o							<0.05					
$\%Ca_{45}$	male	b												<0.01
		o						<0.05						<0.01
	female	b												
		o			<0.05									
$^0/_{00}$ ^{45}Ca/ mg Ca	male	b				<0.05				<0.05				
		o												
	female	b						<0.05						
		o										<0.05		

Explanations: empty columns = nonsignificant differences

b = burned legs
o = opposite legs
d = dried bones (weight)
w = body weight
a = bone ash (weight)
Ca = calcium (radioactive + inactive)

period which covered 70 days. Immediately after the burn and thereafter on the days 2, 4, 8, 14, 21, 35, 42, 49, 56, 63 and 70 five animals from all groups (males, females, burned, healthy) have been injected subcutaneously with 20 μCi ^{45}Ca in isotonic saline. After 48 hours the animals were weighed and killed by overdosage of ether narcosis. The tibiae of the injured and the opposite leg have been removed and cleaned off from soft parts. They have been burned in a muffle furnace at 550 ^{0}C. Their ashes have been individually weighed and dissolved in aliquote parts of HCl. Their calcium was precipitated as an oxalate and filtered in a demountable filtration apparatus. After destinations of activity in individual samples with a G-M counter with a thin mica window the calcium content has been estimated manganometrically (more detailed descriptions of the whole procedure are given in Kolář et al. 1965). The values have been expressed as averages from results of measurements of all five samples, investigated from individual groups of animals. The values have been plotted against the normal values (= 100 per cent) and expressed graphically as well a treated statistically.

RESULTS

All investigated parameters exhibited in a similar way like in our previous experiments an oscillating course round the 100 per cent level used as a reference curve. Both higher and lower values could be seen in burned as well as

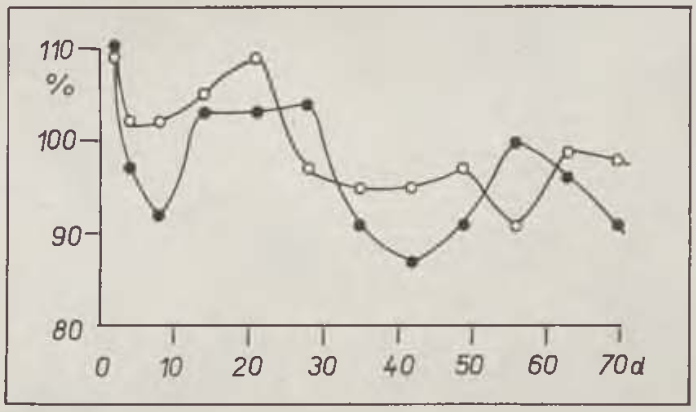

Fig. 1. The weights of dried tibial bones of injured (black symbols) and opposite (white symbols) legs of male rats. Healthy controls = 100 per cent. Ordinate: days of experiment

in opposite non-injured tibias. Illustrative examples are given in the graphs 1 to 4. In the Table I the statistical significance of the main investigated parameter differences is summarized. In addition to them also the body weight of the animals has been investigated: it showed only slight differences in both sexes. Only in female rats there was a significant decrease of the body weight on the day 4 of the experiment ($P<0.05$). Also the weights of dried tibias were significantly lower in injured male rats on the day 35, in the burned ($P<0.01$) as well as in the opposite tibias ($P<0.05$) (Fig. 1). In female rats only the decrease in the burned tibia on the day 70 was statistically significant ($P<0.01$) (Fig. 2). The relations of the weight of dried bones to the weight of the animals (Tab.) increase significantly in the males just on the second day after the burn in particular in the injured extremity. There have also been

further significant differences on the days 49 and 56 (Table). In female rats a significant difference occured later: on the day 28 in the injured tibia and on the days 63 and 70 in the injured but not in the opposite bones.

The bone ash weights did not differ significantly before the day 35 in male rats whereas in female rats the values oscillated significantly mainly in the injured tibia in the days 4, 14, 56 and 70 with increasing significance. The

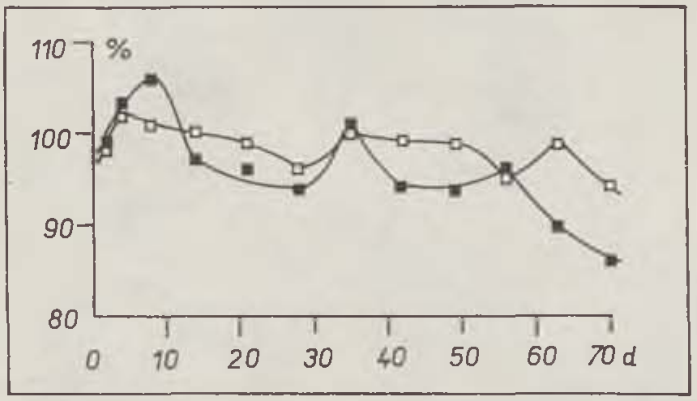

Fig. 2. The same data for female animals

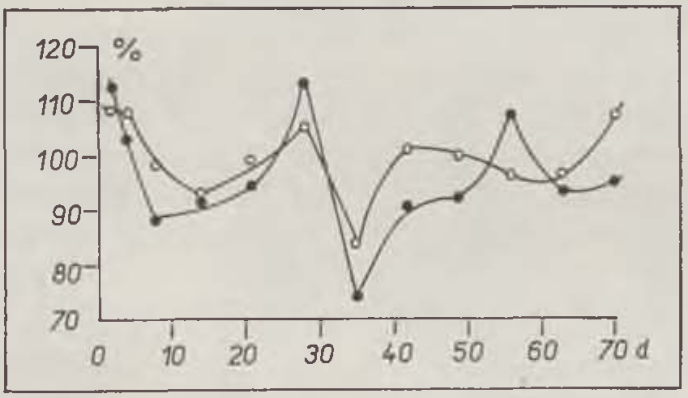

Fig. 3. Percentual uptake from delivered ^{45}Ca-dosis in the burned and opposite tibia of male rats. Healthy animals = 100 per cent. For symbols see explanation in Fig. 1

relations of the weights of dried bones to the bone ashes decreased in male rats significantly on the day 35 and 42 i nthe injured extremity only. In female rats they have been significantly different in both extremities on the day 35 only. Also the whole calcium content was significantly decreased in the burned male tibias on the days 2 and 35 and in the female rats later, on the days 56 and 70. The relation of the calcium content in the tibia to the total body weight was significantly increased in the injured bones of male rats on the day 2 and descreased on the days 42 and 63. In the opposite tibia only a decrease on the day 56 was found. In female rats this decrease was significant in the burned tibia on the days 49, 63 and 70. The calcium content in the ashes of injured tibial bones decreased in male rats on the day 21, in female rats on the day 35 and in the opposite tibias on the days 2 and 35.

The ^{45}Ca uptakes in injured and opposite bones were the main investigated dynamic parameters. We expressed them as per cent from the whole radiocalcium given to the individual animal and incorporated in the investigated bone or as o/oo of the ^{45}Ca in one milligram of calcium of the investigated bone. Also here the values oscilated noticeably. In male rats (Fig. 3) was the initial ^{45}Ca uptake increased, then decreased rapidly with a new increase after six

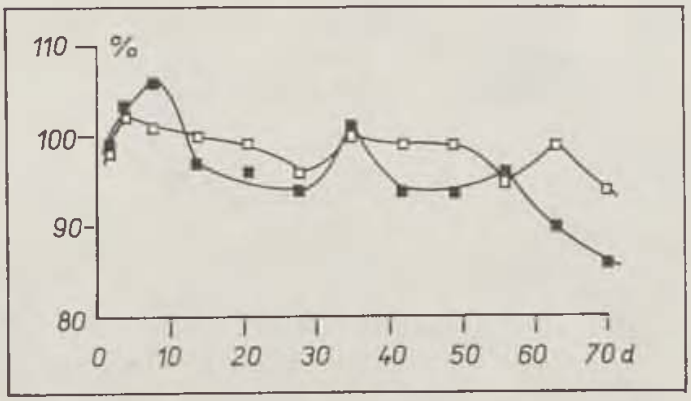

Fig. 4. The same data as in the Fig. 3 for female animals

weeks from the injury and a new decrease at the end of the period. In burned tibias only the difference on the day 70 was significant; in the opposite tibias on the days 28 and 70. In female animals (Fig. 4) the oscillations were similar but only the difference on the day 8 in the opposite tibia was significant. A very sensitive index is the content of radiocalcium in one mg of the whole calcium in the bone. In male rats it documented an important decrease on the day 14 and 42, in female rats on the day 28 and in the opposite tibias also on the day 56 (Table).

DISCUSSION

The present experimental events support the conclusions from our previous investigations (Kolář et al. 1965, 1971a, b). They confirm the existence of a generalized alteration of the mineral metabolism in the skeleton of injured animals. Simultaneously they document definite differences in this reaction caused by the general anesthesia, confirming the theoretical presumptions made before this experiment has been started.

Any thermal injury of a severe degree, even of a limited area of the body surface and without any shock will cause abscopal effects in different organs and distant tissues. In our previous investigations these reactions of supporting tissues, mainly the skeleton, have been studied. Their presence could only be encountered with the aid of our experimental approach using comparative evaluations of investigated parameters in injured and in healthy animals.

The generalized reaction does not take a simple linear course. It oscillates with depressions and elevations during the time. This picture is not specific for the thermal injury and has been encountered in different other physical injuries too (Kolář et al. 1965). A depression caused by negative impact of the damage to the metabolic functions is followed by over-shooted reaction. Such com-

pensatory reactions do not involve the injured area only. Because of lack of appropriate regulative mechanisms they irradiate into the skeleton as a whole.

The course of this reaction differs in the male and female organism (Kolář et al. 1971a, b). It is more impressive in male animals but it gets less impressive after the period of sexual acitivity. In addition, in male rats it takes a longer course whereas in the female animals it tones down earlier. More detailed investigations with radiation-induced injuries have shown that the main reactive change concerns the osteoclastic bone resorption (Kolář et al. 1965). Thus the assumption is justified that the milder course in female animals is due to the protective influence of oestrogens. Oestrogens are known to decrease the bone resorption and to support the mineralization (Ošťádalová et al. 1969; Heřt et al. 1973).

The intensity of the whole-body response is also regulated by the nervous system. It is decreased and its onset is delayed after the denervation of the injured extremity (Kolář et al. 1965). Thus the mediation of the reaction via neural pathways is obvious. In the present experiment we tried to investigate whether also an immediate softening of the painful irritations during the injury will influence this reaction in a similar positive way. And really also with narcosis the protracted and less pronounced course of the reaction was visible in both sexes. Without narcosis the weights of dried bones oscillated between 90 to 110 per cent of normals; with narcosis these limits have never been reached. Also the statistical significance of the differences was lower now. The oscillations without narcosis exhibited also a shorter cycle during the earlier stages of the experiment. After narcosis the maximum of the reaction occured later and its intensity was moderated. The most important differences occured round the 35th day after the burn (Table I) whereas without the narcosis just on the day 17 (compare with Kolář et al. 1971a). The statistical significance of these differences was in male rats originally up to $P<0.001$ whereas with the narcosis with only a few exceptions $P<0.05$ (Table).

Similar differences also concern the radiocalcium uptake in the bones. The initial uptake differences in male and female rats diminished distinctly with narcosis and up to the 35th day there have been only several statistical significances among them. The oscillations round the 100 per cent level were more limited in extent whereas in the animals without narcosis the differences oscillated between the levels of 85 to 120 per cent. Maximal deviations have also been seen after the fifth week. In male rats the uptakes have been depressed in both extremities. In the female rats again, the previously noted and unexplained dissociation appeared: a depression in the burned and increase in the opposite extremity. We have otherwise not seen any further sexually-linked differences in the parameters investigated after the narcosis.

The comparison of the parameters investigated in rats burned without and during a narcosis confirms the presumption at the beginning of the experiment that the suppresion of painful preception will positively influence the course and intensity of the whole-body skeletal response in burned animals. Again, the regulative nervous mechanisms involved in the mediation of this reaction

could be documented indirectly here. A complete suppression of the reaction could not be expected even theoretically: the short duration of the narcosis covered only the immediate period of the injury. The subsequent signalization of pains to the central nervous system has not been influenced substantially.

With respect to the clinical therapy of burns the events of the experiment support the importance of allaying the pains not only to prevent the shock but also other abscopal effects in individual tissues of the organism e.g. in the skeletal system. Our previous follow-up of a comprehensive clinical material reported elsewhere (Kolář et al. 1965) had shown a surprisingly high frequence of osteoporosis and posttraumatic dystrophy in patients with deep burns. They could not be explained by the long-lasting immobilization solely because the most patients have been mobilized early. A participation of a generalized reaction on the rebuilding of bones seems thus to be highly probable according to our experiments. The suppression of this reaction would therefore positively influence the course of the therapy. In the next future it would seem reasonable to investigate the influence of repeated blockades of the main nervous pathways from burned extremities in animals, whether they could suppress the signalization of pains into the higher regulatory nervous centra. It might be expected that such intervention could moderate even more deeply the course of the generalized skeletal response. This woud be of immediate importance for the clinical practice. J. K.

SUMMARY

In this paper the authors link up with the previous experiments on burned rats. A limited burn of one extremity induces a whole-skeletal metabolic shift mediated by endocrine and nervous mechanisms. This reaction is more pronounced in male animals. When the burn has been caused under the influence of a deep narcosis the perception of pain was suppressed and the generalized reaction took a milder and slower course. This finding documments the importance of suppressing the pains during the clinical treatment of burns. It is not only a part of prevention of a shock but also of inhibition of adverse reactions in different body tissues.

RÉSUMÉ

Influances de système des brûlures sur le métabolisme minéral des os

J. Kolář, A. Babický, B. Bíbr, R. Vrabec

Dans ce rapport, les auteurs continuent les expériences précédentes avec les rats brûlés. La brûlure circonscrite d'une extrémité provoque une modification métabolique de tous les os du scelette. Celle-ci se réalise par l'intermédiaire des mécanismes endocriniens et nerveux. Cette réaction est plus distincte chez les mâles. Quand la brûlure était faite sous l'influence d'une narcose profonde, la sensation de la douleur était supprimée et la réaction générale se passe d'une manière plus modérée et lente. Cette constatation prouve l'importance de la suppression des douleurs au cours du traitement clinique des brûlures. Ce n'est pas seulement pour prévenir le choc mais aussi pour réduire les réactions non désirables dans de différents tissus corporels.

ZUSAMMENFASSUNG

Systemische Einflüsse der Verbrennungen auf den Mineralstoffwechsel der Knochen.

2. Einfluss der Allgemeinanästhesie

J. Kolář, A. Babický, B. Bíbr, R. Vrabec

In der vorliegenden Mitteilung setzen die Autoren die vorangehenden Versuche mit verbrannten Ratten fort. Begrenzte Verbrennung einer Gliedmasse ruft eine das ganze Skelett angreifende Stoffwechselverschiebung hervor, die durch endokrine sowie Nervenmechanismen vermittelt wird. Diese Reaktion ist bei den Männchen stärker ausgeprägt. Wenn die Verbrennung unter dem Einfluss einer tiefen Narkose hervorgerufen wird, wird die Schmerzempfindung gedämpft und die Allgemeinreaktion verläuft milder und langsamer. Dieser Befund dokumentiert die Bedeutung der Schmerzdämpfung während der klinischen Behandlung der Verbrennungen. Sie stellt nicht nur einen Teil der Schockvorbeugung vor, sondern auch die Einschränkung unerwünschter Reaktionen in verschiedenen Körpergeweben.

RESUMEN

Influencias de sistema de quemaduras sobre el metabolismo óseo mineral

J. Kolář, A. Babický, B. Bíbr, R. Vrabec

En esta comunicación los autores continúan en los experimentos previos con ratas quemadas. Una quemadura limitiada de una extremidad provoca un cambio metabólico de todos los huesos del esquéleto en el que los mecanismos endocrinos y nerviosos sirven de intermediario. Esta reacción está más expresada en los machos. Al ser provocada la quemadura bajo la influenca de una narcosis profunda se suprime la sensación de los dolores y la reacción general transcurre en forma más moderada y más despacia. Este hallazgo comprueba la importancia de la supresión de los dolores durante el tratamiento clínico de las quemaduras. Esto no es solamente una parte de la prevención del shock, sino también restricción de reacciones no deseables en varios tejidos del cuerpo.

REFERENCES

1. **Heřt, J., Ošťádalová, I., Babický, A., Pařízek, J.:** Early pathological changes in the rat skeleton after administration of a single dose of oestrogens during the first days of postnatal life. Physiol. Bohemoslov., 22, 3 : 225, 1973.

2. **Kolář, J., Babický, A., Bíbr, B., Vrabec, R.:** Systemic effects of burns on bone mineral metabolism. Acta Chir. plast., 13, 3 : 133, 1971.

3. **Kolář, J., Babický, A., Bíbr, B., Vrabec, R.:** Sexually-linked differences in the metabolic bone response in burned rats. In: Matter, P., Barclay, T. L., Koníčková, Z.: Research in Burns. Bern, H. Huber 1971, p. 578.

4. **Kolář, J., Babický, A., Vrabec, R.:** The Physical Agents and Bone. Prague, Academia 1965.

5. **Ošťádalová, I., Babický, A., Kolář, J., Vyhnánek, L., Pařízek, J.:** Changes in bone metabolism in adult rats pretreated with a large dose of oestrogens during the early postnatal period. Physiol. Bohemoslov., 18, 3 : 271, 1969.

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TREATMENT OF PSYCHIC DISORDERS IN PATIENTS WITH BURNS

P. PAVLOVSKÝ, P. POKORNÁ

INTRODUCTION

This report links up with the analysis of psychic disorders in burns sickness published by one of the authors in 1972, describing the symptoms of neurosis as well as of a psychotic character in relation to the severity of the injury, the age of the patient and his premorbid personality.

The question arises as to what may be expected of the psychiatrist in the treatment of burns, if the leading part in the therapeutic team unequivocally belongs to the specialized surgeon. The worst sufferings of the patient is pain. Stengel points to the opinion about the psychiatrist being the last to render help in its alleviation, nevertheless pain as a psychic condition occupies its place in psychiatry. As a matter of fact, painful sensation not infrequently occur in pure psychiatric conditions. Psychogenic or at least psychogenically aggravated pain (Walters) exist and so do people with an increased pain perception (Engel).

Apart from the struggle against pain, to which the psychiatrist chiefly contributes with his knowledge of psychotherapeutic principles, the main part is played by the treatment of emotional disorders which, for a long time, have attracted the attention of medical practioners.

During the second stage of burns sickness, psychotic symptoms occur not infrequently. The knowledge of the effect of psychopharmaceutics in patients without somatic disorders helps the psychiatrist to appraise their effect on patients with burns sickness better than anybody else.

Systematic psychiatric care in some cases of permanent defects which make social rehabilitation difficult, becomes a necessity in prolonged neurotic disorders.

A chiefly psychiatric affair are the patients in whom schizophrenia recurs or their psychopathic character becomes decompensated due to burns.

TYPES OF PSYCHIATRIC TREATMENT

Of the basic types of psychiatric therapeutic procedures, chiefly psychotherapy and treatment with psychopharmaceutics may be used.

A — PSYCHOTHERAPY

When dealing with the patient, a psychotherapeutic approach is taken for granted. It gains the patient's confidence in the hospital staff, encourages him and informs him about the further therapeutic procedures. Also facilitating the contact with his family belongs to it, so does an optimistically presented prognosis and the maximum endeavour to achieve the best possible result by plastic surgery.

Considerable attention has been paid to h y p n o s i s. Emloying hypnosis, Bernstein achieved in burned children with marked neurotic symptoms a better tolerance to pain and a general improvement of their conditions. One of the authors of this report attempted to influence the signs of depressive anxiety neurosis in ten severely burned patients (three women and seven men) by hypnosis. In four of them in whom he succeeded to achieve the third stage of hypnosis with amnesia, painful changes of dressings and surgical procedures were carried out in this condition. The rest of the patients refused to have surgery carried out on them under hypnosis only, because they had partly felt painful sensations during training for hypnosis.

The necessity for s y s t e m a t i c p s y c h o t h e r a p y becomes evident in cases of severe burns which may lead to permanent disfigurement or motility disorders, in consequence of which certain changes in character in the sense of an increased introversion occur. The authors observed ten patients who had suffered burns one to ten years previously. The group consisted of two married men, four with a serious emotional relationship at the time of the accident and four men without any obligations. In one married couple, the relationship was grossly disrupted by the wife, in the other the wife died. The serious emotional relationship was broken down in all cases due to the initiative of the healthy partner. Her loss was considered by the patients to be the greatest tragedy of their lives. In some of them even suicidal thoughts occurred. Later they never again attempted to enter into relations with another partner, in the same way as those who had been without obligation prior to the accident. All of them adopted a resigned attitude to married life no matter of previous experience; they even did not seek a partner who might have been bodily affected in a similar way.

Severe inferiority complexes take their origin from the conspicuous and revolting appearance and from being incapacitated for carrying on with one's occupation and fulfil one's obligations towards the family. The patient feels useless and the question arises as to the sense of further existence.

When answering these questions, some of Frankel's ideas proved their values, particularly those concerning inversion, such as "What can life expect of me?" Except one, all patients were capable of some minor activities for the benefit of others and this could be used for widening the values. Reinforcement of the conciousness of one's own value constituted the nucleus of interviews and consequently admitting them helped the patients to throw off their most oppressive doubts as to the sense of their further existence.

From a psychotherapeutic point of view, the relationship of the patient to his relatives with a positive influence proved very important, particularly if they welcome the opportunity of a medical consultation even from another but purely surgical aspect. During interviews with the patients and their relatives, the mutual value of one to the other was stressed and the endeavour to make contact with a wider circle of friends was reinforced.

According to the authors' opinion, the mode of compensation for the accident also comes within the pattern of psychotherapeutic approach even from a psychiatric point of view. The unwillingness of the employer to pay compensation for the accident proved a traumatizing factor in the post-accidental period and protracted negotiations had an adverse influence on the development of neurotic disorders. The authors assume that severe burns and their sequelae represent such an interference with the patient's life that psychic disorders developing from it, even if only from a phenomenological point of view characterized as neurotic, may be appraised according to the respective notice as a severe psychic disorder and should be compensated as such.

B — TREATMENT WITH PSYCHOPHARMACEUTICS

The experience with the treatment of psychic disorders in patients suffering not only from purely psychiatric but also symptomatic disturbances speaks in favour of employment of psychopharmaceutics. In view of the side effects, doctors are afraid of possible further damage to the organism, particularly the liver which, in burns, has to cope with detoxication of metabolic products originating from the decomposition of necrotic tissue.

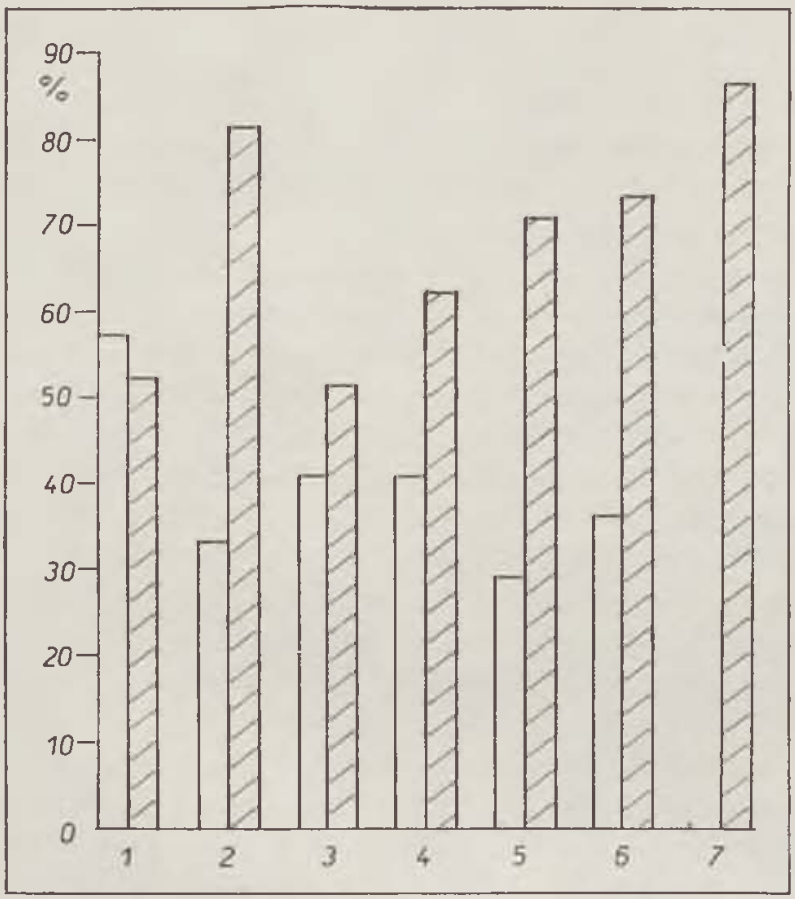
Of the series of 467 patients who were examined by the authors during 1967—1973, 245 required treatment with psychopharmaceutics. The patients were examined during hospitalization twice a week by methods of the usual psychiatric investigation for a total of five weeks. The authors' own scheme of interview procedure with a scale which appraises the most fundamental disorders in patients with burns sickness from a psychiatric point of view, was used for evaluation of the drug effect. These were chiefly subjective complaints of somatic disorders and lack of sleep, the urgency of worries and, objectively, the psychomotor rate, the mood, psychotic signs and the patient's attitude towards the treatment and the medical and nursing staff.

Of the drugs used, the following are referred to below:

Diazepam (Seduxen, Faustan) was administered in depressive anxiety conditions in 78 cases at a daily dose of 10—40 mg for an average period of three weeks (at intervals of 1—8 days). Of the undesirable effects, allergic skin manifestations occurred in one case. Significant improvement was achieved already during the first days of administration in sleep disorders, subjective experiencing of somatic disorders and anxiety moods. In the form of injections at a dose of 40 mg per day, the drug was tested several times with good effect in psychomotor unrest and chronic alcoholism.

Chlorprothixen was chiefly used in cases with depressive anxiety symptoms and an expressively neurotic tension and insomnia. It was ad-

ministered to 41 patients with this symptomatology at a daily dose of 15—60 mg for a period af 2—8 weeks. The anxiolytic effect became apparent within the first two days, but the antidepressive effect only during the second week. The most conspicuous improvement was registered in the sleep disorders, but even other neurotic symptoms were favourably influenced. Somnolence was observed among the side effects which, however, was not considered undesirable. As compared to Diazepam, Chlorprothixen had a more pronounced antidepressive effect.



Graph. White columns — untreated, contoured columns — treated
Graph compares improvement of pathological symptoma in groups of treated and untreated patients: 1 — somatic complaints, 2 — sleep, 3 — worries and fears, 4 — psychomotor tempo, 5 — mood, 6 — attitude towards treatment and medical and nursing staff, 7 — psychotic symptoms

Chlorpromazine was used in the form of injections at doses of 50—100 mg i.m. in cases with psychomotor unrest and showed a favourable effect.

Thioridazine was administered according to the general experience for its good tolerance to elderly patients with psychotic symptoms. It was given to 25 patients at a daily dose of 25—100 mg for a period of two weeks at an average. Improvement was registered in 15 cases of slight unrest, chiefly at night. In the remaining patients the drug had to be replaced by Plegomazine.

Of the antidepressive drugs, Prothiaden was used in severe depressive reactions in twelve patients for an average period of three weeks at a daily dose of 75 mg. Side effects, chiefly dry mucosae and thurst of a slight degree were observed in seven patients. Improvement took place in all cases and became manifest already at the end of the second week.

Imipramine (Tofranil, Melipramine) was tested in a total of eight cases. In three of them, improvement of the apatheticabulic syndrome took place at a daily dose of 75 mg during the third week of administration.

Occasional administration of psychomimetics (Phenmetrazine) proved unfavourable.

With regard to side effects, including those registerable by laboratory tests, it may be said that they never reached a degree which would have necessitated to interrupt administration of the respective drug before time.

A group of 132 patients treated in the years 1972 and 1973 with psychopharmaceutics was compared with a group of 60 patients who had only been examined by the psychiatrist but not been treated. This was done for the appraisal of the effect of pharmacotherapy. Improvement was evaluated using the nonpaired T-test (group of untreated patients: 35.5 : 17.45; group of treated patients: 68.3 s = 13.39). The result was significant at the 1 % level. In view of the possibility to register the zero occurrence of psychotic disorders in the group of patients who had not been treated, the two groups were statistically compared even with the omission of item 7 (occurrence of psychotic symptoms).

(The values of the non-paired T-test in the group of unreated patients: average 41.4 s = 8.43; group of treated patients: average 65.3 s= 11.81.) The result is also significant at the level of 1 % significance. The comparison is shown in the graph.

From the observations carried out hitherto, the conclusion may be drawn that in psychic complications occurring during burns sickness psychiatric care is inevitable. Expertly conducted psychotherapy helps to control the frequent psychological disturbances in patients including their sometimes complicated relationship with the medical and nursing staff. Frequently supporting pharmacotherapy which in cases of severe emotional disorders and psychotic symptoms occupies a leading role in the treatment, cannot be avoided.

Acknowledgement: The authors wish to thank Prof. H. Pešková, M. D., DrSc, Doc. R. Vrabec, M. D., CSc and prim. J. Doležalová, M. D. of the Plastic Surgery Department in Praha 10 for making it possible for them to acquire and publish the data referred to above. B. K.

SUMMARY

The authors have dealt with the possibilities for psychiatric treatment of psychic disorders in burns sickness. Of the psychotherapeutic procedures, attention has been paid to the psychotherapeutic approach, hypnosis, individual systematic psychoterapy and the question of compensation in case of an accident at work. Of the psychopharmaceutics the effects of Diazepam, Chlorprothixen, Chlorpromazine, Thioridazine and of the antidepressives those

of Imipramine and Prothiaden have been registered. The efficacy of psychopharmaceutics has been confirmed by comparison with a group of patients with psychic symptoms who had not been treated with drugs. The results achieved bear witness to the fact that special psychiatric care occupies a solid place in the treatment of burns.

RÉSUMÉ

Traitement des troubles psychiques dans les cas de brûlures

P. Pavlovský, P. Pokorná

Les auteurs s'occupent des possibilités d'un traitement psychiatrique des troubles psychiques chez les maladies causées par les brûlures. Dans la sphère des procédés psychoterapeutiques, ils prêtent leur attention à la psychoterapeutique, hypnose, psychoterapie systématique individuelle et ă la question des dommages-intérêts en cas d'un accident du travail. Des médicaments psychotropes, on note les effects de diazepam, chlorprothixen, chlorpromazine, thiozidazine, des antidépressifs imipramine et Prothiaden. L'efficacité des médicaments psychotropes est certifiée par la comparaison avec le groupe des malades ayant des malaises psychiques et traités par la manière mentionnée. Les résultats obtenus donnent le témoignage que le traitement psychiatrique professionnel occupe une place fixe dans la domaine des brûlures.

ZUSAMMENFASSUNG

Die Behandlung psychischer Störungen bei Verbrennungen

P. Pavlovský, P. Pokorná

Die Autoren befassen sich mit den Möglichkeiten der psychiatrischen Behandlung der Geistesstörungen bei der Verbrennungskrankheit. Im Bereich der psychotherapeutischen Verfahren schenken sie Aufmerksamkeit der psychotherapeutischen Annäherung, der Hypnose, der individuellen systematischen Psychotherapie und der Frage der Entschädigung im Falle des Arbeitsunfalles. Von den Psychofarmaka analysieren sie die Wirkungen von Diazepam, Chlorprotixen, Chlorpromazin, Thioridazin und unter den Antidepressiva die Wirkungen von Imipramin und Prothiaden. Die Wirksamkeit der Psychofarmaka wird durch Vergleich mit einer Gruppe von Patienten mit psychischen Beschwerden überprüpt, die auf diese Weise nicht behandelt wurden. Die gewonnenen Ergebnisse sind Beweis dafür, dass die fachgerechte psychiatrische Betreuung im Bereich der Verbrennungen ihren festen Platz hat.

RESUMEN

Tratamiento de trastornos psíquicos en los casos de quemaduras

P. Pavlovský, P. Pokorná

Los autores se ocupan de las posibilidades del tratamiento psiquiátrico de trastornos psíquicos en las enfermedades a consecuencia de quemaduras. De la esfera de los procedimientos psicoterapéuticos prestan su atención al acceso psicoterapéutico, a la hipnosis, psicoterapia sistemática individual y a la cuestión de retribución en caso de un accidente de trabajo. De los medicamentos psicotropes están notados los efectos de diazepam, clorprotixen, clorpromazin, tioridamin, de los medicamentos anti-

depresivos imipramin y Protiaden. La eficacia de los medicamentos psicotropes es averiguada por comparación con un grupo de pacientes con trastornos psíquicos que no fueron tratados por el método mencionado. Los resultados aseguidos sirven de prueba de que el tratamiento psíquico ocupa su lugar firme en la esfera de las quemaduras.

REFERENCES

1. **Andreasen, N. J. C., Noyes, R., Hartford, C. E., Brodland, G., Proctor, S.:** Management of Emotional Reactions in Seriously Burned Adults. New Engl. J. Med., 286 : 2, 1972.

2. **Bernstein, N. R. C.:** Management of Burned Children with the Aid of Hypnosis. J. Child. Psychol., 4 : 1963.

3. **Bernstein, N. R. C.:** The Care of Burned Victims. New Engl. J. Med., 286 : 2, 1972.

4. **Engel, G. L.:** Psychogenic Pain and the Pain-Prone Patient. Amer. J. Med., 26 : 899, 1959.

5. **Kryazhev, S. V.:** Neuro-Psychic Changes in Patients with Burns Sickness (in Russian), Inst. of Surg., Acad. Med. Sc., Moscow, 1971.

6. **Pavlovský, P.:** Occurrence and Development of Psychopathologic Phenomena in Burned Persons and their Relation to Severity of Burns, Age and Premorbid Personanlity. Acta Chir. plast., 14 : 2, 1972.

7. **Pavlovský, P., Pokorná, P.:** Psychic Disorders in Patients with Burns and Influence of Psychopharmaceutics (in Czech). International Congress on Burns, Praha. Sept. 1973.

8. **Stengel, E.:** Pain and the Psychiatrist. Brit. J. Psychiat., 111 : 795, 1965.

9. **Walters, A.:** Psychogenic Regional Pain alias Hysterical Pain. Brain, 84 : 1, 1961.

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THE USE OF DERMAL FLAPS IN THE TREATMENT OF PROTRUDING EARS

N. I. ELSAHY

The important cause of protruding ears is the insufficiently pronounced antihelical fold due to an abnormally large cephaloconchal angle. This was first described by Luckett (6) in 1910. He also described the basic technique for its correction. This involved excision of skin and conchal cartilage on the posterior auricular surface along the future antihelical line and eversion of the cut edges of the cartilage with Lembert sutures. This technique has been modified by many surgeons for the following reasons:

1. In order to avoid the creation of a sharp antihelical fold which is a common disadvantage of this technique. Some authors recommend the weakening of the spring of the cartilage instead of its excision either by cross cutting Becker [Becker (1)], by rotary wire brush [Converse et al (2), Stark et al (10)], or by parallel incisions on the posterior side of the cartilage along the line of the desired fold [Pierce, et al (9)] or on its anterior side [Stenstrom (11)].

2. In order to avoid the protrusion of the lower pole of the ear which is also a common complication of Luckett's technique. Becker (1) removed the tail of the helix, while Groulian and Conway (4) suture the tail of the helix to the conchal cartilage.

Experience with these methods showed the following:

1. Using nonabsorable suture for transfixing the cartilage can cause many problems. Initially I used 3—0 black silk. The dark colour of the sutures was usually seen through the thin postauricular skin as bits of dirt. This problem was solved by using white silk, however in both cases, the problem of infection and protrusion of the silk through a sinus tract in the postauricular skin was so common that I decided to abandon the use of nonabsorbable material in the ear. The risk of infection from these materials was also noticed by Jayes and Dale (5) in 1951.

2. Weakening the spring of the cartilage with a Stryker dermabrader [as recommended by Nordzell (8)] in addition to posterior shaving of the prominent part of the tail of the helix (not total excision) gives the best results. This gives a smooth folding for the antihelix and prevents the protrusion of the lower pole of the ear.

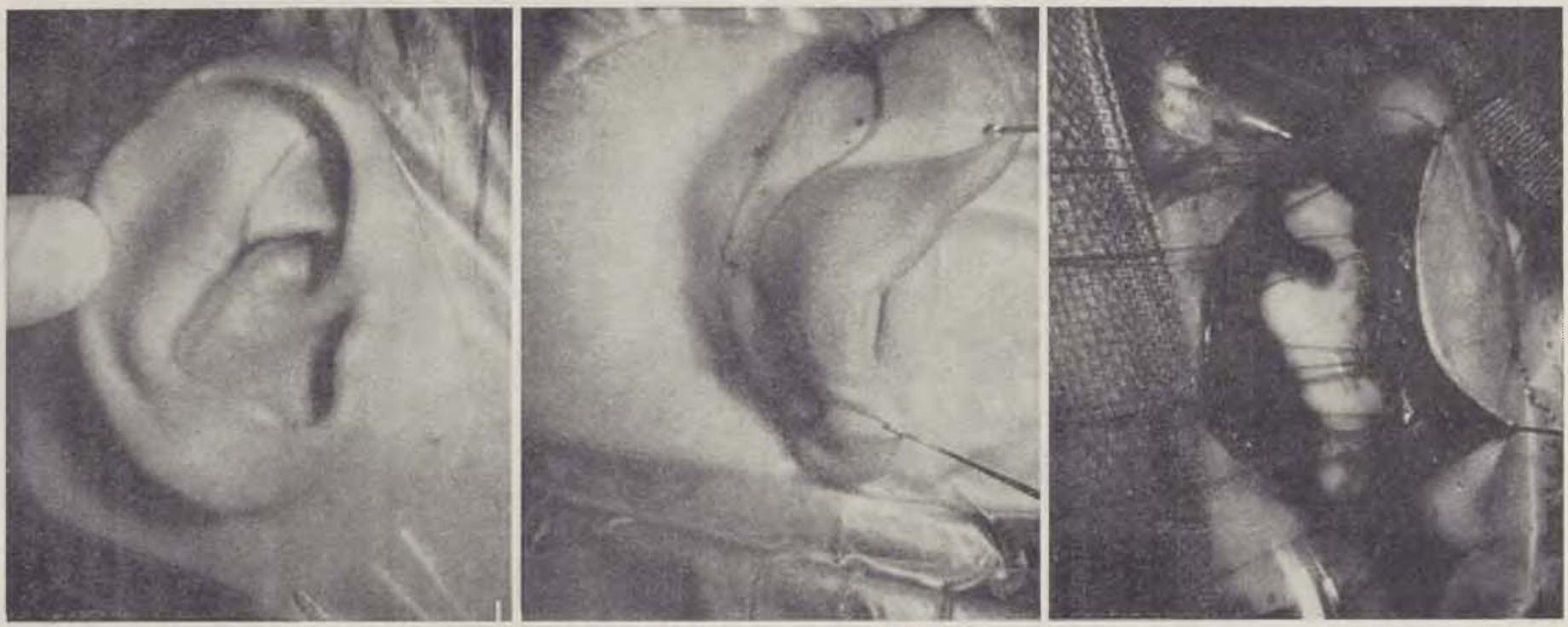

Fig. 1. Operative Procedure. — a) Anterior surface of the ear. The correct antihelix, posterior crus and anterior crus are marked in dye. Notice the importance of folding the ear back. — b) Posterior surface of the ear. The dots that mark the antihelix's position are used as an axis around which a "dumb-bell" shaped piece of skin is marked. This area will constitute the dermal flap. — c) The exposed cartilage has been thinned with the dermabrader along the dots shown. Five sutures in place connecting the dermal flap with the mastoid fascia ready to be tied

Fig. 2. Case I. a) left — pre-operative, b) right — immediate post-operative

With these two facts in mind the following technique was designed and practically applied on ten patients during the last two years.

OPERATIVE TECHNIQUE

1. Fold the ear back and outline the correct antihelix, the anterior crus and the posterior crus on the anterior surface of the ear (Fig. 1a).

2. Pass a hypodermic needle immersed in a dye, from the anterior surface to the posterior surface of the ear in five points along the marking described.

3. Using the line on the posterior surface of the ear as an axis, a strip of skin is outlined. This strip is generally "dumb-bell" shaped (Fig. 1b). The size of the upper or lower pole of this outlined skin can be increased or decreased according to the amount of protrusion of the upper or lower pole of the auricle.

4. Remove the epidermis in the outlined area.

5. Cut deep along the cephalic border of exposed dermis to include the whole thikness of the dermis and subcutanseous tissue down to the cartilage, Raise the flap of dermis and subcutaneous tissue toward the edge of the auricle, exposing all the marked dots on the cartilage.

6. Dissect the tail of the helix and shave its posterior prominent part.

7. Obtain complete haemostasis.

8. Use the Stryker dermabrader along the marked dots on the cartilage (Fig. 1c) to obtain the proper tinning required. This can be ascertained by alternate shaving and observation of the anterior surface of the auricle while testing the degree of resistance that is met by folding the ear backward.

9. Pass a 3—0 chromic catgut suture on a curved needle through the dermal flap to the mastoid fascia and back to the dermal flap. Before tying this suture insert another 4 similar sutures along the dermal flap (Fig. 1c);

Fig. 3. Case V. a) left — pre-operative, b) right — eighteen months post-operative

then tie them. This flap will easily bring the weakend cartilage backward creating a smooth antihelical fold.

10. Suture the skin edges using continuous 4—0 plain catgut.

11. For dressing, apply jelonet along the suture line and absorbent cotton immersed in liquid petroleum along all the concavities in the ear and behind the ear. Then place small pieces of fluffed gauze over the dressing and wrap a kerlix bandage around the head to cover the ears.

12. Remove the dressing after one week.

DISCUSSION

The technique described has proved its advantages practically. It was applied on 10 patients (19 ears) with constantly good results. Some of these patients are shown in Fig. 2 and 3. Two years follow up revealed no complications. This technique has the following advantages:

1. Simple, fast and gives good results.

2. It avoids the use of nonabsorbable transfixing sutures in the cartilage. The dermal flap is strong enough to hold the already weakened cartilage backward. This will avoid all the mentioned complications of using non-absorbable sutures.

3. The dermal flap takes the tension off of the suture line. This will avoid a wide scar. The resulting scars were much less noticable.

4. No skin excision in the postauricular sulcus in necessary. Erich (3) maintained that a scar in this position would cause soreness and discomfort in patients who wear glasses, and would also be more noticable.

5. No recurrence was obserwed in any of the patients and normal sensation in the back of the ears was regained between 2—3 months.

6. Through the same incision, correction of other deformities can be done in addition to the correction of the protruding ears. e.g. partial excision of Darwin's tubercle or prominent tail of the helix.

SUMMARY

A new method for treatment of protruding cars is described. The method was utilized with 10 patients (19 ears) to date, with constant good results and no complications. The advantages of the method are outlined.

RÉSUMÉ

Utilisation des lambeaux cutanés pour la correction des oreilles décollées

N. I. Elsahy

On décrit une nouvelle méthode de correction des oreilles décollées. Jusqu'ici, elle a été vérifiée sur 10 patients (19 oreilles). C'était toujours avec de bons résultats et sans complications. On introduit les avantages de cette nouvelle méthode.

ZUSAMMENFASSUNG

Anwendung der Hautlappen bei der Korrektur der abstehenden Ohren

N. I. Elsahy

Der Autor beschreibt eine neue Methode der Korrektur der abstehenden Ohren. Die Methode wurde bisher an 10 Patienten (19 Ohren) überprüft, stets mit guten Ergebnissen und ohne Komplikationen. Die Vorteile der neuen Methode sind angeführt.

RESUMEN

Empleo de lóbulos cutáneos en la corrección de orejas resaltantes

N. I. Elsahy

Está descrito el método nuevo de la corrección de orejas resaltantes. Hasta ahora el método ha sido averiguado en 10 pacientes (19 orejas), siempre con resultados buenos y sin complicaciones. Están detalladas las ventajas del método nuevo.

REFERENCES

1. **Becker, O. J.:** Correction of the protruding deformed ear. Brit. J. Plast. Surg., 5 : 187, 1952.

2. **Converse, J. M., Nigro, A., Wilson, F. A. & Johnson, N.:** A technique for surgical correction of lop ears. Plast. reconstr. Surg., 15 : 411, 1955.

3. **Erich, J. B.:** Surgical correction of protruding ears. Proc. staff meet., Mayo Clinic., 33 : 99, 1958.

4. **Groulian, D. Jr., Conway, H.:** Prevention of persistent deformity of the tragus & lobule by modification of Luckett's technique of otoplasty., Plast. reconstr. Surg., 26 : 399, 1960.

5. **Jayes, P. H., Dale, R. H.:** The treatment of prominent ears. Brit. J. Plast. Surg., 4 : 193, 1951.

6. **Luckett, W. H.:** A new operation for prominent ears based on the anatomy of the deformity., Surg. Gynec. Obstet., 10 : 635, 1910.

7. **Monks, G. H.:** Boston Med. Surg. J., 84 : Jan. 22, 1891.

8. **Nordzell, B.:** A new method for correction of protruding ears., Acta Chir. Scand., 129 : 317, 1965.

9. **Pierce, G. W., Klabunde, E. H., & Bergeron, V. L.:** Useful procedures in plastic surgery., Plast. reconstr. Surg., 2 : 358, 1947.

10. **Stark, R. B. & Saunders, D. E.:** Natural appearance restored to the unduly prominent ear. Brit. J. Plast. Surg., 15 : 385, 1962.

11. **Stenström, S. J.:** Cosmetic deformities of the ears, in plastic surgery. A concise guide to clinical practice: Grabb & Smith, Little, Brown & Co., Boston 1968, p. 513

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TRAUMATIC SKIN DEFECTS OF THE HAND

I. MATEV

A total of 740 patients with traumatic injuries of the hand and forearm were treated at the Hand-Surgery Division of the Hospital of Reconstructive Surgery in Sofia in the last ten years. Altogether 52 % of them required skin plasty. This group of patients constitutes the subject of the following report.

The method of skin plasty was determined by the type and extent of the injury and by two other, very important considerations:

1) The function of the palmar aspect of the hand is not only grasping, but it also serves as sensory organ.

2) The dynamic stereotype of the hand contrasts with prolonged mobilization and many stages of skin transplantation.

Based on many-year experience with the treatment of traumatic injuries to the hand and fingers, the author formulated the following principles for the choice of a suitable skin plasty:

a) Lacerated skin flaps must be saved and used as much as possible, because no other skin can substitute for the specific skin of fingers and hand. Flaps on the palmar aspect of the hand, cut off their blood supply, may be changed into free skin grafts with a pedicle after the fatty tissue has been removed from them.

b) For reconstruction of the strategic areas of the hand, the trouli tactiles, the thenar and hypothenar and particularly the pulps of the thumb and fingers, local flaps or the skin from the dorsal aspect of the hand should be used in the first palace.

c) The basic and most frequently used transplant in large traumatic defects of the hand is a free split-skin graft. It plays the part of a definite and passive coverage of the defect, which will never acquire the functional and sensory properties typical of the skin of the hand. In order to diminish the dimensions of such a graft, it is sutured under certain tension resulting in the surrounding skin being gradually stretched under the influence of the shrinking free graft.

d) Small wound areas measuring only a few square millimeters rapidly heal by second intention and leave a small, point-shaped scar. Practice has

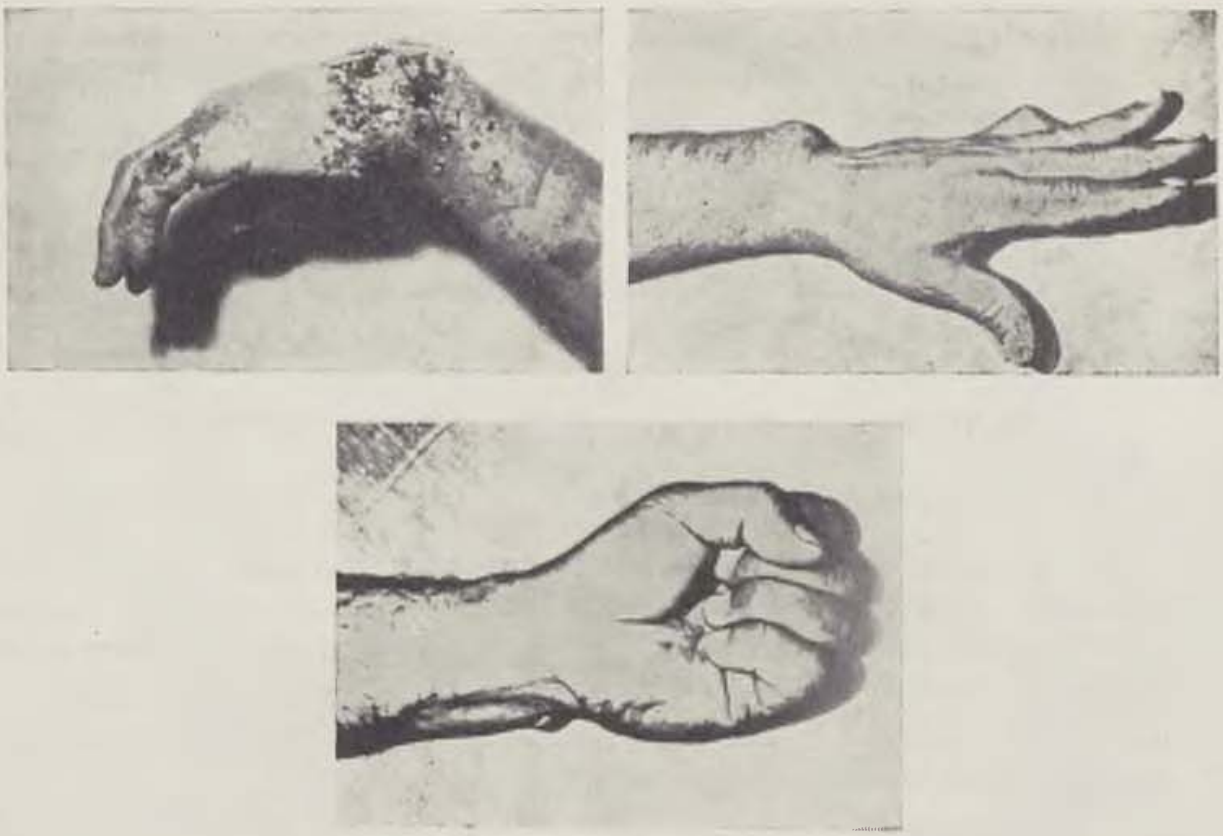

Fig. 1. a) Man aged 25, injured by explosion of a detonator cartridge in his hand. Exposure of radiocarpal and intercarpal joints. Head of ulna dislocated dorsally. Triquetrum missing, scaphoid broken. Injuries to extensor tendons of hand and fingers. Palmar structures intact as well as skin on radial side of hand and forearm — b) and c) Nine years after primary operation. Skin defect on dorsum of hand covered with local flaps formed from neighbouring radial skin. Donor sites covered with free skin grafts. In same way, i.e. with free skin grafts, was ulnar aspect of forearm covered, where skin had been evidently non-viable. On primary operation, extensor tendons were reconstructed using local sources. Fractured scaphoid healed rapidly. Head of ulna left in a stable position of dorsal subluxation, little finger in a position of flexion contracture of proximal interphalangeal joint.

shown that limited scars, except those which have become hypertrophic, are much better from a functional point of view than a skin graft.

e) Distant skin flaps from the abdomen or thorax are used in cases, where there are no other possibilities for covering deep traumatic defects.

Problems arise in the treatment of the following three groups of severe injuries to the hand with skin defects: crush, gunshot (Figs. 1a, b and c) and wringer injuries (Figs. 2a, b and c).

C r u s h i n j u r y : Such injuries are characterized by severe damage to the bones and joints small skin defects and bruises to large parts of the skin. The difficulty in wound toilet lies in that it is impossible to immediately determine whether or not the contused skin was viable. The object of primary surgery in these cases is to stabilize the bony skeleton. This is best effected with Kirschner

wires. Tendons and nerves are usually not treated. The skin is then provisionally sutured. It requires a few days to expose the fate of the contused skin cover. The hand is nursed in an elevated position so that drainage of venous blood and lymph is facilitated. Subsequent treatment is decided by the condition of the skin.

Gunshot Wounds: Severe damage to all tissue layers of the hand and fingers characterizes these injuries. Also in such cases, the first task is to provide stable immobilisation of the bony skeleton and remove all non-viable tissues. Unremittiing check-up of the condition of the hand must be carried out for several days and then the postponed skin plasty, using split-

Fig. 2. a) Girl aged 16. Forearm was caught in a machine with rolling cylinders. Skin torn off, only connected to original site by two narrow pedicles, a proximal and a distal one. Primary operation carried out in the following manner: Subcutaneous fat excised, except for small areas in the region of undamaged medial cutaneous nerve of the forearm; skin replaced to original site like a free skin graft on pedicles. Skin of a small area in region of elbow sloughed off. It was excised on tenth day after accident and residual defect covered with split-skin graft which took up without complication

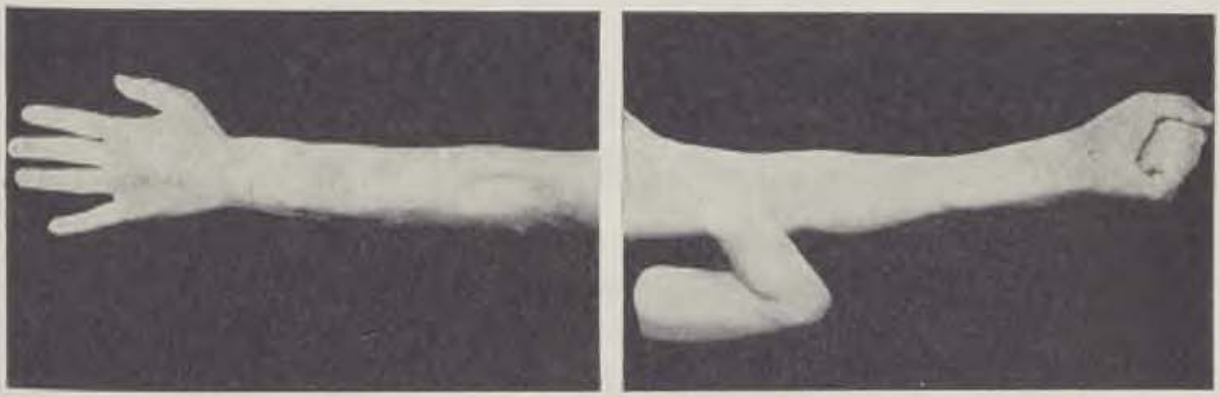

Fig. 2. b) and c) Condition after five years. Full functional restoration of limb. No complaints

skin grafts, seems the best method of treatment, disregarding the fact that in two of the author's patients uneventful healing of wound defects after primary skin plasty was observed (Fig. 1).

Continuous microdrainage proved particularly useful in gunshot wounds and crush injuries of the hand.

Degloving injuries: The main criterion of surgical procedure in such cases is the presence of the palmar bundles of vessels and nerves. If they are intact, first of all free-skin grafting should be considered. If the bundles of vessels and nerves have been pulled out and one of the fingers has been injured, the most rational treatment is amputation. In multiple injuries, the author carries out amputation through the middle phalanx or exarticulation through the proximal interphalangeal joint, covering the remaining part of the fingers with a free skin graft. Experience has shown that, if primary shortening of the fingers is not carried out, spontaneous mummification of the distal and even larger parts of the middle phalanx takes place.

In degloving injuries of the thumb, independent of the condition of the palmar bundles of vessels and nerves, shortening is avoided. No bone reconstruction can provide a better skeleton than the bone of the thumb itself, even if its joints are ankylosed. In the author's opinion, the most suitable and successful primary treatment of a thumb with loss of skin is the following: Coverage of the palmar aspect of the thumb with a skin flap from the dorsal aspect of the index finger, which includes both dorsal bundles of vessels and nerves, and to cover the residual wound surface with a split-skin graft. An alternative of this typ of treatment is to cover the naked thumb with an direct Filatov pedicle flap followed by a Holevich flap taken from the dorsal aspect of the index finger for restoring sensitivity to the thumb. B. K.

SUMMARY

Of 740 patients with traumatic injuries to the hand 52 % required skin plasty. Surgical procedure in three characteristic severe injuries, i.e. crush injury, gushot and degloving injury of the hand with skin defects are described in short. A combination of local and free skin plasty seems to be the best method for covering the skin wound of the hand.

RÉSUMÉ

Défauts cutanés traumatiques de la main

J. Matev

C'est 52 p.c. de 740 lésions traumatiques de la main qui avaient besoin d'une plastie cutanée. L'article décrit sommairement les interventions médicales sur trois blessures lourdes et caractéristiques de la main ayant des défauts cutanés: c'était en cas de «crush» de blessures d'arme à feu et de blessures avulsives. Il apparaît que la combination d'une transplantation locale et libre est le meilleur mode de recouvrir une blessure cutanée de la main.

ZUSAMMENFASSUNG

Traumatische Hautdefekte an der Hand

I. Matev

Unter 740 Fällen der traumatischen Handverletzung erforderten 52 % der Fälle Behandlung mit Hautplastik. Im Artikel werden ärztliche Eingriffe bei drei charakteristischen schweren Handverletzungen mit Hautdefekten kurz beschrieben: bei „Crush" Einschussverletzungen und Avulsionverletzungen. Die Kombination der lokalen und freien Hauttransplantation erscheint als beste Methode zur Deckung der Hautwunde an der Hand.

RESUMEN

Defects cutáneos traumátidos de la mano

I. Matev

52 % de los 740 casos traumáticos de una herida de la mano necesitaron una plástica cutánea. En el artículo se describen con concisión intervenciones médicas en tres heridas graves características de la mano con defectos cutáneos: era en los casos de „crush", heridas d'avulsion y las de balazo. Una combinación del trasplante cutáneo local y libero se muestra ser el mejor medio para cubrir las heridas cutáneas de la mano.

REFERENCES

1. **Matev, I.:** Stoicheva, Y.: Industrial Injuries to Hand from Machines with Drilling Mechanisms (in Bulgarian), Nauchni Trudove na RBVChPR (Scientific Papers in Bulgaria), V. VI, 29, 1965—1966.

2. **Matev, I.:** Wringer Injuries of the Hand, J. Bone J. Surg., 49-B, 722, 1967.

3. **Holevich, J.:** A New Method of Restoring Sensibility to the Thumb, J. Bone J. Surg., 45-B, 496, 1963.

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N. P. Demichev: **Tendon Homoplasty in Reconstructive Surgery** (translated from Russian)

Prof. Demichev, a graduate of the Rostov School of Surgery, is submitting in 13 chapters extensive experimental material and the results of 210 operations in which he used tendon auto- and homografts as well as synthetic Lavsan material. He used cooled, frozen and also lyophilized natural grafts. He expresses opinion on the indications and contraindications and on operational techniques, analysing the operational results carefully with special consideration of errors and complications. In the introductory chapters he also discusses the collection and preparation of the graft and its preservation by different methods.

It is a complexly conceived monograph which will be read with interest and benefit by everybody concerned with the grafting of tendons and other tissues.

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CONSIDERATIONS OF FURTHER DEVELOPMENT OF CLINICAL GENETICS

M. TOLAROVÁ

Clinical genetics is a branch of medicine dealing with inborn defects of human organism. Its importance largely increased during the last several years. Practically in each specialized branch of medicine a part devoted to contributions of clinical genetics could be found (9, 12). Importance of clinical genetics for a man and human society is apparent. Its practical significance accounts for the growing interest in the basic research. The health of man is both inherited and acquired entity (3).

In this article most probable ways of further development of clinical genetics will be considered, especially in respect to morphological inborn malformations and possibilities of their prevention (i.e. ways of decreasing their incidence).

In the simplest form the three stages of the development of clinical genetics could be distinguished. The knowledge arising from scientific research is necessary for clinical application of the results. In the first stage the data are accumulated. During the second stage the analysis of the data is performed. The final synthesis, conclusions and conseqences (including preventive measures) belong to the third stage.

I. RESEARCH

A) Accumulation of data

Mendel's ingenious approach was in application of statistical methods to genetics. Genetic laws could be discovered, only if large samples were studied. Sometimes also primitive populations and isolates are investigated. While it is true that the mode of inheritance of majority of morphological inborn defects does not usually correspond to simple Mendelian laws (10), the accumulation of data represents even more and more important task. The main aim in this stage is collection of well documented pedigrees for each genetic disease and congenital malformation followed. The sample should be as large as possible. The state registration of all inborn defects in Czechoslovakia since 1964 was an inevitable step towards full registration of all inborn defects in our population. The information obtained serves as a basis for the next stage.

B) Analysis of data

There are several methods of analysis of data gathered in the first stage. In fact, both stages are closely bound together and only theoretically are distinguished. Analysis of data may be performed on two levels:

Formal genetics

a) statistical analysis (incidence, mode of inheritance etc.), computer programms, testing of genetic hypotheses (11) etc.,
b) karyology,
c) immunogenetics,
d) experimental teratology (evaluation of embryotoxic and teratogenic substances),
e) others.

Physiology of gene

a) biochemical investigations on molecular level (1) (relations genotype — phenotype), mapping of chromosomes etc.,
b) role of cellular environment,
c) role of external environment (mutagenes),
d) others.

C) Final synthesis

The two stages described supply information necessary for detailed final synthesis, i.e. definition of causal factors (internal-genetic, or external-extragenetic, environmental) involved in determination of inborn malformations and explanation of their mode of action. Nowadays, this stage seems to be rather hypothetical, however, this is the ultimate aim of all our effort. The term "final" regards only to the given problem and data studied. In the third stage some investigations may be closed, but usually new questions are revealed, which are to be studied, as it was described.

II. PRACTICAL APPLICATIONS — "PREVENTIVE GENETICS"

Genetic medical service — genetic counseling

Similarly as in each medical branch, the first step in genetic counseling is also recognition of anamnestic data. In clinical genetics it leads to drawing of a pedigree, where all accessible data on ancestors and relatives of a proband should be noted. Further necessary step is identification of the disease by means of examination of the patient using usual medical and specific genetic methods, i.e. stating of exact diagnosis. It is followed by genetic prognosis and recommendation of the most suitable resolution of the investigated situation representing a parallel to therapy. The recommended methods belong to two groups:

1) "Destructive" eugenic methods
   — artificial abortion,
   sterilization,
   — contraceptive methods.

These methods prevent a child to be born in the risk family. They do not decrease the population incidence significantly, however, they diminish its increase.

2) "Constructive" eugenic methods

- choice of the child's sex (by sex-linked inborn defects),
- planned parenthood,
- preconceptional and early prenatal care of risk pregnancies (an inborn defects with multifactorial mode of inheritance),
- protective regime in the family (by inherited diseases like diabetes, hypertension, gastric and duodenal ulcus etc.),
- semiadoption (artificial fertilization) and perhaps adoption as well (in the proper sense of the term).

They are methods of elimination of undesirable part of the child's genotype and methods of elimination of some (sometimes potential) embryotoxic and teratogenic factors of external environment (e.g. by inborn defects with multifactorial mode of inheritance, where the effect of environmental factors is combined with genetic basis, usually of polygenic type). These methods do not suppress fertility in the risk families, but prevent (by specific measures) the child with inborn defect to be born or its inherited disease to be manifested.

With this point is closely connected the very important problem of p r e v e n t i o n of inborn defects, The p r e v e n t i v e g e n e t i c m e t h o d s (in the broadest sense of the idea) are:

a) preconceptional
- e.g. chromosomal examination of parents (choromosomal abnormalities, m. Down etc.),
  screening of carriers of metabolic disorders with autosomal recessive mode of inheritance etc.;

b) prenatal
- e.g. aminocentesis and chromosomal and biochemical evaluation of aminotic fluid components,
  ultrasound examination of fetus,
  fetoscopy etc.

It is apparent that prevention depends on genetic prognosis, both aspects being interconnected and influencing each other.

The r e g i s t r a t i o n of individuals with inborn defects of diseases and individuals with higher empiric risk of their occurence in children is prerequisite for all preventive methods and prognostic conclusions in clinical genetics. The genetic registration should start with sex-linked diseases, autosomal recessive and autosomal dominant diseases may follow and inborn defects with multifactorial mode of inheritance could be the last.

From the preventive genetic point of view, the s p e c i a l c a r e of individuals living and working in the environment with higher level of mutagens and embyotoxic or teratogenic factors is also very important. The same regards

to patients treated with drugs with known (or suspected) mutagenic or teratogenic effect (cytostatics, anticonvulsives etc.).

The publicity of genetic and preventive genetic information is also very important and should be as broad as possible.

III. POSSIBILITIES IN CZECHOSLOVAKIA

At first, large samples of pedigrees of probands with various inborn defects should be collected.

Further our effort will be directed towards individual prevention of malformations with sufficiently known genetics and pathogenesis in endangered families. Individual prognosis (empirical recurrence risk of the inborn defect) should be established according to coefficient of relationship to proband in all persons with presumed risk figure as high as 10 %, in some more serious inborn defects also about 5 %. Knowledge of names of the registered probands (and of their relatives) with autosomal dominant, autosomal recessive and sex-linked diseases enables active depicting of individuals endangered by occurence of malformation in their children. Diagnostic and preventive genetic methods can be applied (2).

Diagnostic possibilities should also be studied in detail (4, 17). In addition to the screening of carriers, more attention should be devoted to the microforms of inborn defects, which represent minimal expressions of the genetic basis. Both, studies in families with affected individuals and studied in normal population may serve to this purpose (14). Especially valuable are studies of ratios affected: unaffected children of an individual with microform of the inborn defect. The "associated signs" should also be looked for. They are not microforms in respect to their character (as they are not minimal degree of morphological inborn defect), but their occurence in proband's relatives is significantly higher, if compared to general population. In born defects determined multifactorially (facial clefts, congenital luxation of the hip etc.) one or several "abnormal minor genes" of the polygenic system might cause occurence of "associated signs" in otherwise normal individuals. Even in monofactorially determined malformations (syndactyly, polydactyly) the "associated signs" should be looked for. They represent an expression of a polygenic system forming a genetic "background" or an "environment" that influences expression of the "major" gene causing malformation. Some signs occuring together with malformation may, of course, be due to the presence of a genetic linkage. The exactness of evaluation of microforms and "associated signs" (especially in morphological malformations) requires the use of objective measurements (anthropometry, X-ray, face-prints etc.). During analysis of data (especially in morphological monofactorially determined malformations) the methods summarizing properties of "healthy" and "affected" parental branches should be preferred to classical statistical tests (X^2, t-test etc.). Tests of heterogenity between these two groups can be applied, as well as between real and adequate hypothetical samples.

The attention of geneticists and of all people concerned with medicine should be devoted to teratogenicity of chemical agents and drugs (5, 6, 8, 13). There are many new drugs produced and some might be dangerous for developing human embryos. Although the teratogenic effect of cytostatics, anticonvulsives, androgenic steroids etc. is well-known, sometimes even these dangerous drugs are prescribed to a pregnant woman. In most chemicals and drugs the teratogenic effect is still unclear or irregularly expressed (antibiotics with largescale effect, anticoagulants, Librium, Tofranil, LDS). Teratologiststs and physicians taking care of pregnant women should be interested mainly in this last group of medicaments.

Also geographic factors seem to be very important. Various studies and casuistics are showing teratogenicity of substances present in the external environment [organic compounds of Hg (8), sulphydryl groups, organic solvents etc.]. Such substances may be accumulated in the environment of certain areas with special kinds of industry, or in purely agricultural areas where chemicals are presently widely used as fertilizers, pesticides etc., and specific diseases of animals (toxoplasmosis) and of agricultural products (moulds) may accur.

From the complexity of factors described could be assumed that it is practically impossible to protect the human population against all so called "potential" teratogens and mutagens. Moreover, the susceptibility of mother and fetus to these substances in individually specific. The most striking fact is that teratogens are effective only in early stages of pregnancy (greater part up-to 2 months of human embryo's age, smaller part still during the 3rd month) when majority of pregnant women do not know about them being pregnant and, of course, they are not registered by gynecologist. So, when the physician starts his care of pregnant women, it is usually late for prevention of possible effect of teratogens. The only solution is planned gravidity, when before planned conception and during several weeks in the beginning of gravidity all medication is excluded (of course, if it would not be dangerous for other reasons). If drugs with certain teratogenic effect were used during the teratogen-sensitive period of fetal development, then an artificial abortion is recommended (16).

It is necessary to inform as many people as possible by means of popular lectures, booklets etc. on all problems related to inborn defects, as more successful prevention of them may be reached. Information on problems of mutagenicity, embryotoxicity and teratogenicity of chemical substances, drugs and environmental factors should lead to increased precaution of prospective parents before conception and in early stage of gravidity. Very important is the in-time registration of individuals with a malformation or with "associated signs" similarly as is important the prevention of secondary deprivation and psychosocial problems of patients and of their surroundings.

It may be supposed that many problems could be solved in rather near future. However, the real prognosis of the third synthetic stage and new preventive proposals can be worked out only after fulfillment of the first and the second stages. In addition to the recently known problems, new problems

may arise during the time — e.g. concerning genetic background of inborn malformations or environmental factors like teratogens, embryotoxic substances and mutagens — and they might require immediate solution as well.

IV. POSSIBILITIES OF INTERNATIONAL COOPERATION

During the last years the inborn defects became a topic which attracted the interest of scientists all over the world. In some special problems international groups were formed and often were supported by international organizations like WHO, UNESCO etc. However, cooperation in many tasks of clinical genetics has not yet been fully utilized.

Cooperation of socialist countries would be favourable and should be greatly encouraged. Socialist countries have similar systems of health care, which will make such cooperation easier. Scientific places with their own experience in studies on certain malformations should be chosen as organizers in given fields. Our laboratory is able to help with organisation of epidemiologic and genetic research of morphological inborn defects (especially facial clefts) in countries that would be interested in (7, 15). Cooperative large-scale and long-time research would significantly contribute to solution of many recent problems related to inborn defects in man. M. T.

SUMMARY

An accelerated development of clinical genetics in last years, which is connected with important discoveries in experimental genetics, led to penetration of clinical genetics practically into all fields of medicine. In many cases, however, the knowledge of etiology of inborn defects is missing. In this article the stages of clinical research in genetics are described, leading to preventive methods attempting to decrease population frequence of inborn defects. Diagnosis of morphological inborn defects by means of microforms and "associated signs" is discussed. The attention is devoted to possibilities of prevention of genetically determined inborn defects, to mutagenicity, embryotoxicity and teratogenicity of some chemical substances and medicaments. Recent methods and methods planned in the near future in genetic counseling and in preventive genetics are described in detail, especially a method of preconceptional and early prenatal care of risk pregnancies and a method of planned gravidity. Their significance as indirect methods of preventive genetics is emphasized.

RÉSUMÉ

Réflexion sur le développement de la génétique clinique

M. Tolarová

Le développement rapide de la génétique clinique étant sans doute en rélation étroite avec beaucoup de découvertes dans la domaine de la génétique expérimentale signifie la pénétration de celle-ci dans presque toutes les branches médicales. Dans beaucoup de cas, il faut trouver les réponses sur les questions traitant l'étiologie des différents défauts congénitaux. L'article décrit les degrés de la récherche clinique

dans la domaine de la génétique qui désèlent les méthodes préventives à l'aide desquelles on s'efforce de réduire la fréquence des défauts congénitaux. Puis, il discute la question du diagnostic des défauts congénitaux morphologiques à l'aide de microformes et de signes de l'association, même que la question des formes convenables du traitement de tel matériel. On prête l'attention soit aux questions de la prévention possible des défauts congénitaux conditionnés par la génétique, soit à la problématique toujours plus importante de la mutagénèse, de l'embryotoxicité et de la tératogénèse des certaines matières chimiques et des médicaments. Il décrit précisement les possibilités contemporaines des consultations génétiques et de la génétique préventive qui est la méthode d'aujourd'hui et de celle-ci qui est réele dans le futur prochain. On introduit la méthode de préconception et des soins prénatals opportuns de la grossesse de risque. On décrit l'importance des celles-ci comme des méthodes indirectes de la génétique préventive.

ZUSAMMENFASSUNG

Betrachtung zur Entwicklung der klinischen Genetik

M. Tolarová

Der schnelle Aufschwung der klinischen Genetik, der zweifelsohne mit einer Reihe von Entdeckungen in der experimentellen Genetik verbunden ist, bedeutet ihre Durchdringung in praktisch alle Medizinfächer. In einer Reihe von Fällen ist Antwort auf die Frage nach der Ätiologie dieses oder jenes angeborenen Fehlers zu suchen. Die Abhandlung beschreibt die Stufen der klinischen Forschung auf dem Gebiet der Genetik, die zu prophylaktischen Methoden führt, welche die Herabsenkung der Frequenz der angeborenen Fehler bestreben. Man diskutiert die Frage der Diagnostik der morphologischen angeborenen Fehler mittels der Mikroformen und der einsoziierten Merkmale sowie auch die Frage der geeigneten Verarbeitungsformen dieses Materials. Aufmerksamkeit wird geschenkt sowohl den Fragen der möglichen Prophylaxe der genetisch bedingten angeborenen Fehler als auch der stets mehr schwerwiegenden Problematik der Mutagenität, Embryotoxizität und Teratogenität einiger chemischer Stoffe und Arzneimittel. Ausführlicher beschreibt die Autorin die gegenwärtigen Möglichkeiten der genetischen Beratung und der prophylaktischen Genetik — Methoden der Gegenwart und Methoden, die in der nahen Zukunft reell sein werden. Die Methode der Präkonzeptionsfürsorge und der frühzeitigen Pränatalfürsorge um risikobedrohte Schwangerschaften und die Methode der geplanten Schwangerschaft wurden angeführt und ihre Bedeutung als indirekte Methoden der prophylaktischen Genetik wurde beschrieben.

RESUMEN

Reflexión sobre el desarrollo de la genética clínica

M. Tolarová

El desarrollo rápido de la genética clínica el que ciertamente está en relación con la serie de descubrimientos en la genética experimental significa su penetración prácticamente a todas las especialidades médicas. Es una serie de los casos en que hay que encontrar las respuestas a las cuestiones sobre la etiología de cierto defecto congénito. En el artículo se describen los grados de la investigación clínica en el campo de la genética que conducen a los métodos de prevención que se esfuerzan por disminuir la frecuencia de defectos congénitos. Se discute la cuestión del diagnóstico de los defectos congénitos morfológicos con ayuda de microformas y signos

asociados así como la cuestión de las formas convenientes de la elaboración de tal material. Atención está prestada a las cuestiones a la posible prevención de la genética de los defectos congenitales condicionados así mismo a los problemas siempre más importantes de la mutagenesis, embriotoxicitis y teratogenesis de algunas sustancias químicas y medicamentos. La autora describe más detalladamente las posibilidades contemporáneas de consultorio genético y genética preventiva — los métodos presentes y los a realizar en el futuro cercano. Está mencionado el método de la preconcepción y el cuidado oportuno sobre el embarazo de riesgo y el método del embarazo planificado y está descrita la importancia de los mismos como métodos indirectos de la genética preventiva.

REFERENCES

1. **Bonner, J.**: The molecular biology of development. Oxford, Clarendon Press 1965.

3. **Carter, C. O.**: An ABC of medical genetics. London, The Lancet LTD 1969.

6. **Kalter, H.**: Correlation between teratogenic and mutagenic effects of chemicals in mammals. In: Chemical mutagenes. New York-London, Plenum Press, Vol. I., 1971.

7. **Klásková, O.**: An epidemiologic study of cleft lip and palate in Bohemia. Acta Chir. plast., 15, 4 : 258, 1973.

8. **Klingberg, M. A., Abramovici, A., Chemke, J.**: Drugs and fetal development. Advances in Experimental Medicine and Biology. New York-London, Plenum Press, Vol. 27, 1972.

11. **Morton, N. E.**: Computer applications in genetics. Honolulu, University of Hawaii Press 1969.

12. **Reisman, L. E., Matheny, A. P.**: Genetics and counseling in medical practice. Saint Louis, The C. V. Mosby Company 1969.

14. **Tolarová, M.**: Genetic research and recurrence risk in clefts. 2nd International Congress On Cleft Palate, Copenhagen 1973.

17. **Warkany, J.**: Congenital malformations. Chicago, Year book medical publishers Inc. 1971.

18. **Wilson, J. G.**: Present status of drugs as teratogens in man. Teratology, 6, 7 : 3, 1973.

References No 2, 4, 5, 9, 10, 13, 15 and 16 are available at the author.

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IN MEMORIAM

A. B. WALLACE — 1974

Professor Alister Burns Wallace, the general secretary of the International Society for Burn Injuries, deceased suddenly and unexpectedly on December 14th, 1974. Thus went one of the outstanding physicians and noble men, an internationalist in the true sense of its meaning. He was professor of plastic surgery at the Faculty of Medicine in Edinburgh. He founded the I.S.B.I. in 1965, having again been elected at the Fourth International Congress in Buenos Aires in September 1974 to head it as the general

secretary. He deserved well of the organisation of therapy and prevention of burns within the frame of the World Health Organisation. He has been a great friend of Czechoslovakian Plastic Surgery and admired Czechoslovakia very much indeed, visiting it several times. At the occasion of the 3rd International Congress of I.S.B.I. in Prague in 1970 he was awarded the silver medal of Charles University. He held this honour in high esteem. His name will be permanently held in deference in the thoughts of all his friends and students all over the world.

R. Vrabec

Dr. VARAZTAD H. KAZANJIAN — 1974

Dr. Varaztad H. Kazanjian, profesor emeritus at the Harward Medical School and an internationally known pioneer in plastic surgery died at his home in Belmont the 19. 10. 1974 at the age of 95. Kazanjian was born in Armenia and came to USA at the age of 16.

Upon being graduated at the Harward Dental School in 1905 he joint the teaching stuff of the school.

In 1915 he went to France as dental chief of a Harward Medical Unit to serve in world war I. There he continued and expended his interest in treatment of facial injury. In recognition of his services he was invested a companion of St. Michael and St. George in 1919.

He returned to Harward as professor of military oral surgery in the dental school and as a student in the medical school, from which he was graduated in 1921. He was named professor of clinical oral surgery in 1922 and became first professor of plastic surgery in 1941. He was the author with Dr. John Converse of "Surgical Treatment of Facial Injuries". Still, at of the time of the death he was a consultant in plastic surgery.

Dr. O. Klásková-Burianová

Prof. Dr. MILOSLAV SEEMAN, DrSc. — 1975

The founder of the Czechoslovakian phoniatry prof. Dr. Miloslav S e e m a n, DrSc., died in Prague on 11. II. 1975 at the age of 83. From the small unit which he established in 1922 at the ear, nose and throat department of Charles University, he built up the present University Department with the possibility of hospitalisation. This has become the place of training not only for our specialist but even for many from abroad. The Department is the place of intensive research- and scientific work. Prof. Seeman published its results in several books and in more than 120 articles, many works were published by his disciples.

The conception of the branch as formulated by prof. Seeman more than 50 years ago is quite modern to-day, because it takes care of the process of communication in its physiology and pathology. Prof. Seeman included not only voice and speech into the branch but even hearing, because he established since the start the inseparable connection between these 3 functions in normal development and also in pathology. His conception of the branch was accepted in its full width in 1972 at the constituting assembly of the Union of European Phoniatricians and prof. Seeman was elected honorary chairman. He was member of many foreign special societies and his work was appreciated by high awards abroad and in Czechoslovakia.

The Czechoslovakian plastic surgeons are extremely grateful to prof. Seeman for his many years of interest in the speech of children and in cleft palates and chiefly also for organizing the highly qualified care for phoniatry and logopedics afforded in

the entire country. When academician F. Burian started after World War 1 to establish and develop the specialized branch of plastic surgery, he found in prof. Seeman since the start not only a faithful friend but even an enthusiastic co-worker. Already in 1922 prof. Seeman published the principles of phoniatric therapy after plasty of the cleft palate, he studied the importance of pharyngofixation and repeatedly came back to this theme in his publications. In the first years prof. Seeman examined all the children for us, to-day we have in Czechoslovakia 2 professors, 4 associate professors and more than 60 specialized phoniatricans-physicians and almost 50 phoniatric departments.

Czechoslovakia has lost in prof. Seeman a great scientist, physician, organizer and a wonderful person.

He shall always be in our hearts!

Prof. Dr. H. Pešková, DrSc.,
Head of the Department of Plastic Surgery, Prague

NEWS

International, Multi-Discipline Meeting on Plastic Surgery to be Held in Chicago, June 8—13, 1975.

Leading practitioners of head and neck plastic surgery from around the world will share their knowledge and techniques during a multi-discipline, international medical congress to be conducted in Chicago, June 8—13, 1975.

The meeting, titled the "Second International Symposium on Plastic and Reconstructive Surgery of the Head and Neck", is sponsored by the American Academy of Facial Plastic and Reconstructive Surgery, Inc. It will be held in the Continental Plaza, the Drake and the Playboy Towers Hotels located on Chicago's near northside.

For registration details write: George A. Sisson, M. D., General Chairman, Second International Symposium 303 East Chicago Ave. Chicago, Illinois 60611.

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The Center for the Study of Aging, Inc. and Wingate Institute for Physical Education and Sport announce A Satellite Seminar at Wingate Institute, Israel prior to the 10th International Congres of Gerontology on Physical Exercise and Activity for the Aging, June 19—21, 1975. Scientific papers invited. The program includes invited speakers, panels, workshops, and visits to rehabilitation facilities. Registration limited to professional and allied personnel in medicine, physical education, sports, gerontology, and rehabilitation.

Cooperating agencies include the President's Council on Physical Fitness and Sports; National Graduate University; and the National Council on the Aging, Inc.

For further information, submission of papers and registration, write: Dov Aldubi, Ph. D. Scientific Director Wingate Institute for Physical Education and Sport, Wingate, Israel.

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The 2nd Congress of the E.A.M.F.S. has been held in Zurich from September 16th to 21st 1974. President of the meeting was Prof. Dr. H. Obwegeser. There have been 509 active participants from 38 countries. 144 papers and 19 scientific films have been presented.

The new elected Council of the E.A.M.F.S. 1974—1976 consits of the following members:

N. L. Rowe (Great Britain), President; H. L. Obwegeser (Switzerland), Immediate Past President; M. Perko (Switzerland); W. Koberg (W.-Germany); L. Calatrava (Spain);

D. Knapik (Poland); J. Toman (Czechoslovakia); P. Berger (Belgium); M. Glahn (Denmark); C. Curioni (Italy); L. Merville (Francie); J. Sowray (Great Britain).

The 3rd Congress of the E.A.M.F.S. will be held in London during the 2nd week of September 1976.

Doz. Dr. Helene Matras (Univ. Klinik für Kieferchirurgie — Wien) P. R. Manager

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At its annual meeting the Spanish Society of Plastic, Reconstructive and Esthetic Surgery held on 21st of December of 1974, the following officers were elected for two years:

President: Lorenzo Mir y Mir

Vice-President: Ramon Moreno Lorenzo

Secretary: Jose M Fernandez Villoria

Treasurer: Manuel Rodriguez Aguirre.

Members of the council: Francisco Jesus Crisol Martos, Antonio Franco Diaz, Jacobo Maiz Bescansa, Isabel Vazquez Zegri.

The next National Congress will be held in Santiago de Compostela, June 3—8 1975.

Jose M Fernandez Villoria, Secretary Spanish Society of Plastic, Reconstructive and Esthetic Surgery, Santa Isabel 51, Madrid 12. Spain

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"Sanvenero Rosselli Meeting" in Paris. To pay homage to the memory of Prof. Gustavo Sanvenero Rosselli, the colleagues who knew, esteemed and loved him are warmly invited to a meeting which will be held during the International Congress in Paris in order to study the possibility and the opportunity to found a Society in his memory.

The place and time of this Meeting will be communicated in occasion of the opening of the Paris Congress.

For further information kindly apply to: Ernesto P. Caronni, M. D., Via Montenapoleone, 8, 20121 Milano, Italy

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In the week following the International Congress on Plastic and Reconstructive Surgery in Paris the German Society for Plastic and Reconstructive Surgery will hold its annual meeting in Stuttgart from 4 — 7 th. September 75 and would be very happy, if many guests from other countries might take part. Prof. Dr. Dr. Schmid, President, 7000 Stuttgart 5, Böheimstrasse 37

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From 29 June through 3 July 1975 the **IX European Surgical Congress** will be held in the International Congress Centre RAI in Amsterdam, the Netherlands. The main theme of this congress, organized by the Netherlands Section of the International

College of Surgeons and the Collegium Chirurgicum Amstelodamense, will be "Controversial Opinions in Surgery". In 36 sessions specialists having more or less controversial opinions on a subject will present introductory papers, which will be followed by short presentations, for which abstracts can be submitted.

A panel discussion will conclude each session.

During the congress an exhibition on Surgical equipment is held in the Exhibition Centre RAI adjacent to the Congress Centre RAI.

About 1500 specialists from all over the world are expected to participate in this congress, especially because in 1975 Amsterdam commemorate that 700 years ago its name appeared for the first time in the history of the Netherlands and because the social and ladies program of the congress will be in the scope of this celebration.

Further information and preliminary programs can be obtained from the congress secretariat:

Organisatie Bureau Amsterdam B. V. P. O. Box 7205, Amsterdam, The Netherlands. Telephone: (020) - 44 08 07; Telex: 13499 (racio); Cables: ORBU Amsterdam.

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At the September meeting, the **Swiss Society for Plastic and Reconstructive Surgery,** elected the following members as officiers for the period of 1974—76: President: Dr. Leo Clodius; Vice-President: Dr. R. Kob Wintsch; Secretary: Dr. C. Koechlin, 6 Ave de Champel, Geneva 1200, Switzerland.

The next annual meeting will be held from October 2—4, 1975.

■ ■

The Excerpta Medica Foundation announces the convening of the First international congress on patient counselling, which will be held from 21st - 23rd April 1976 in Amsterdam, The Netherlands.

Plenary sessions will deal with the following subjects:

Should the patient be told the truth?

Doctor awareness of patient counselling needs

Techniques of patient counselling

Legal aspects of being a patient

Patient counselling in psychiatric illness

Labelling of drugs

Influence of the mass media on patient behaviour

Patient counselling as the beginning of social action

Sectional sessions will be devoted to the following topics:

Patient counselling in hospital treatment

Patient counselling in chronic diseases

Death and dying

Communicating with the mentally retarded

Adjustment to loss of major body function

Patient couselling and the general practitioner

Patient counselling as a part of medical training

The role of the health professional in patient counselling

Patient counselling in paediatrics

Patient counselling in geriatrics

The Excerpta Medica Audiovisual Patient Information Award

The Excerpta Medica Foundation will award a prize for the best audiovisual programme dealing with patient counselling submitted for display at the Congress.

For further details: First International Congress on Patient Counselling c/o Excerpta Medica Foundation

P.O. Box 1126, Amsterdam, The Netherlands

The Editiors should like to appologize to the readers for the delay in starting volume 1975 caused in the production of the Journal. Double issue will solve the matter.

Alla A. Limberg, V. V. Nekachalov

ON THE ROLE OF BIOLOGICAL PREPARATION OF RECIPIENT BED IN FREE TRANSPLANTATION OF BONE

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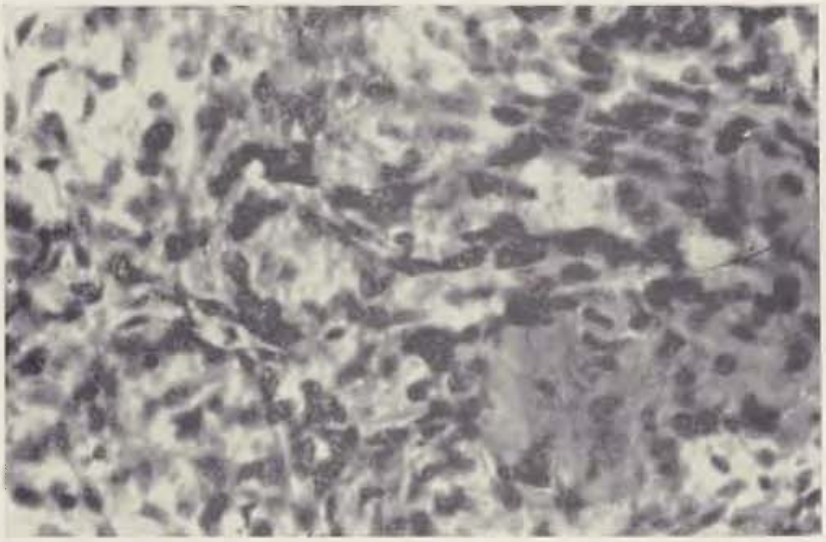

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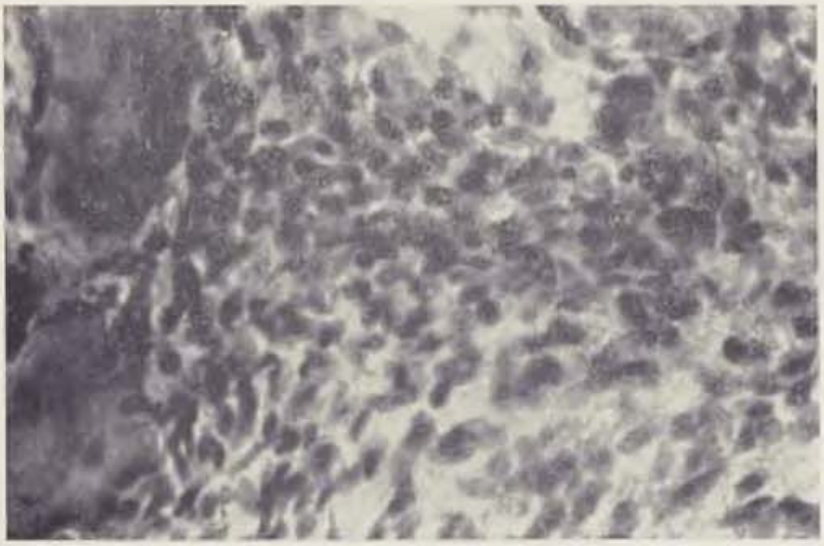

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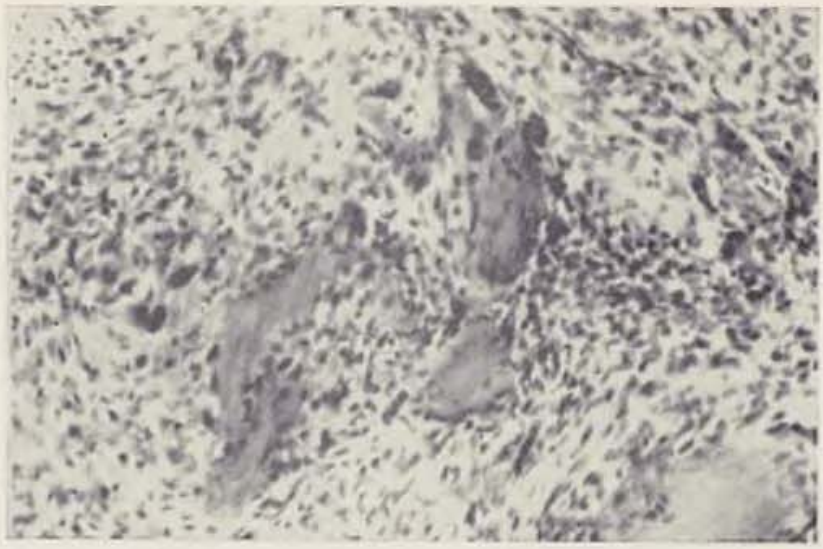

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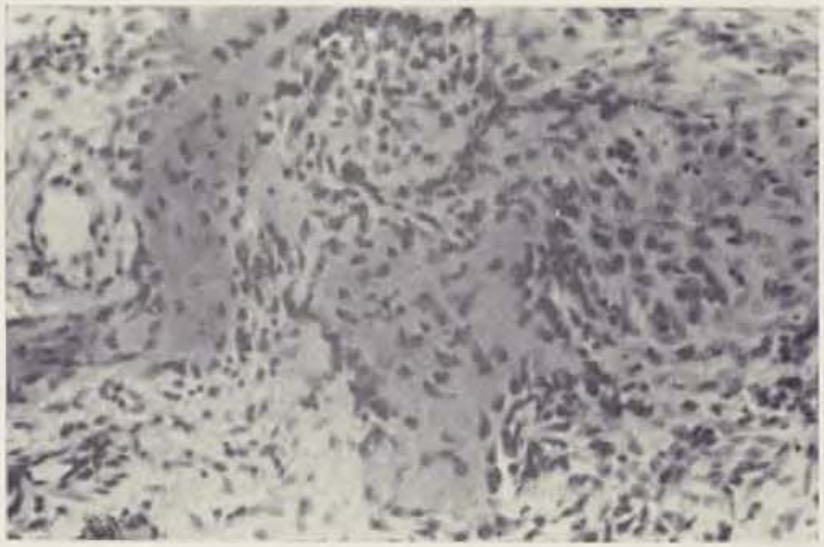

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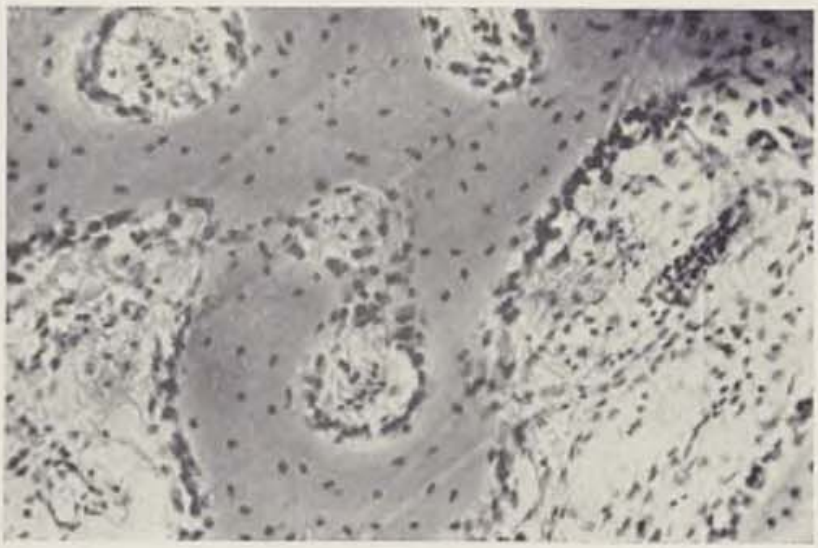

2c

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COMPARABLE ASPECTS OF THE EMPLOYMENT OF SOLID AND SPILT HOMOTRANSPLANTS IN BRIDGING LARGE SEGMENTAL DEFECTS IN LONG BONES

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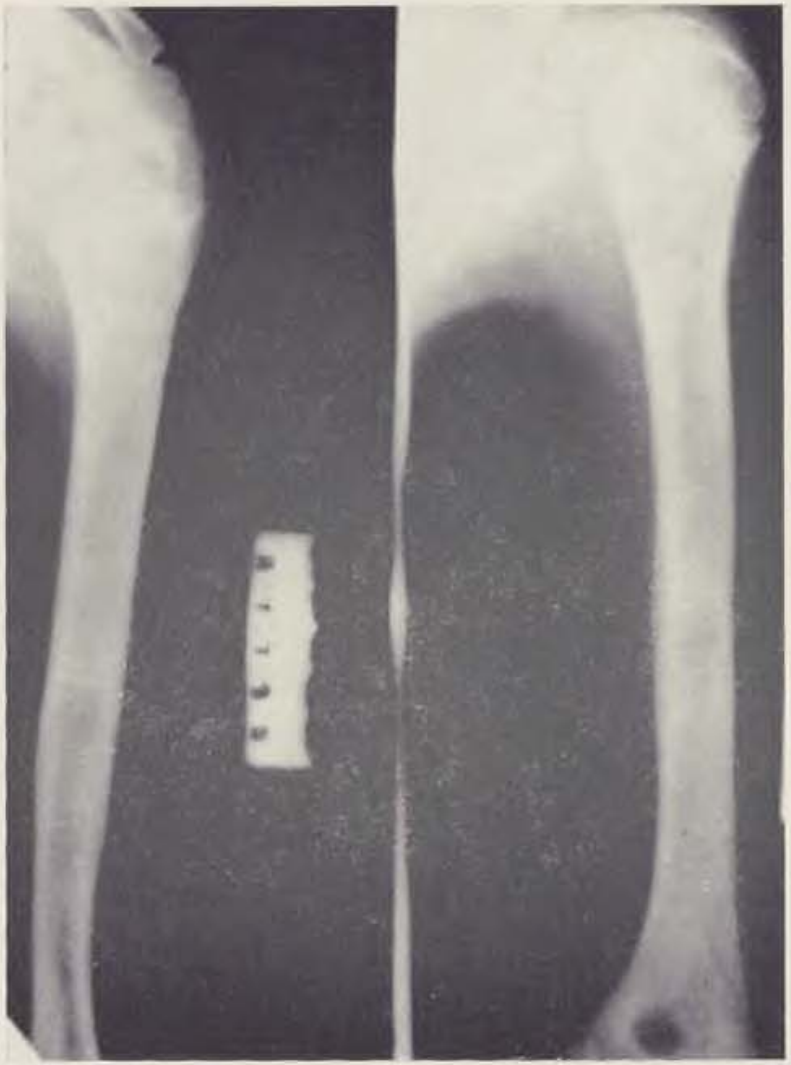
Fig. 4. Roentgenogram of osteoblastoclastoma (cystic form) of humerus with pathological fracture. — Fig. 5. Roentgenogram after segmental excision. Defect bridged with tube-shaped homotransplant longitudinally divided with saw



6 7

Fig. 6. Roentgenogram 8 months after operation. Fusion of transplant with recipient bed is evident. — Fig. 7. Roentgenogram 18 months after operation. Restoration of normal bone in region of defects has taken place