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ACTA CHIRURGIAE PLASTICAE — 12, 3, 1970



2nd Pecher's Hospital of the Capital Kiev (USSR) — Head V. E. Kolkov, M.D.

# MODELING AND TRANSFER OF COMPOSED BONE AUTOGRAPH IN TUBED FLAP — IN EXPERIMENT

I. L. DEGEN

Till the present, the composed pedicle bone graft is the best plastic material in treatment of pseudoarthrosis and defects of hollow bones. A short pedicle of soft tissues is uncomfortable however or might make it even impossible to transfer the graft from one anatomic area to another. For this reason the method of composed bone plastics in tubed flap is in principle represented in present surgery only by the Gana operation and its modifications, unless we take the bone-plastic amputations by Pirogov, Gritta and their improvements into consideration.

The names of Nicoladoni (1903), Esser (1917), E. K. Nikiforov (1932), B. V. Parin (1942), N. N. Blochin (1947), A. G. Lapchinskiy (1946, 1957) practically complete the list of authors carrying out distant composed bone plastics.

In the endeavour to work out methods which would extend the possibilities of transfering composed bone graft from one anatomic area to another one, we carried out 60 operations in 24 dogs.

The condition of composed bone graft in tubed flap was studied in 15 animals one and two weeks, one month after its modeling, after first and

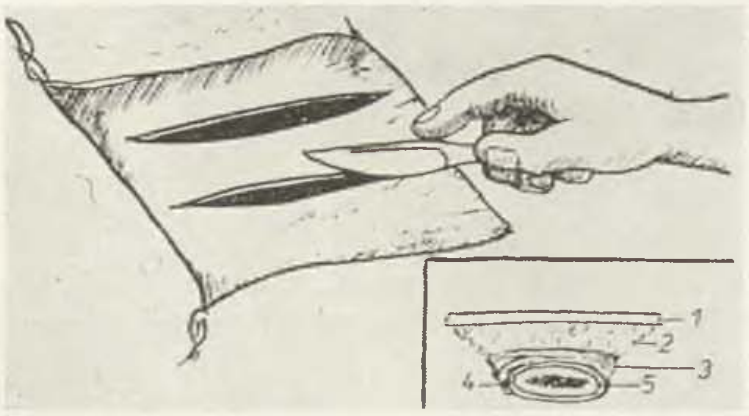


Fig. 1. Cutting out of soft tissue stripe. 1 — skin, 2 — subcutaneous connective tissue, 3 — muscle, 4 — periosteum, 5 — bone

second migration in 9 animals — 1, 3 and 6 months after the final stage of plastic surgery — covering the defect in dog tibia by bone graft in tubed flap.

After studying 260 serial graduated histologic preparates we learned that the composed bone autograft in tubed flap, remains alive and capable of regeneration after its modeling in all stages of migration. In the concluding

Fig. 2. The elevator is slipped below the rib from one cut into the other one.

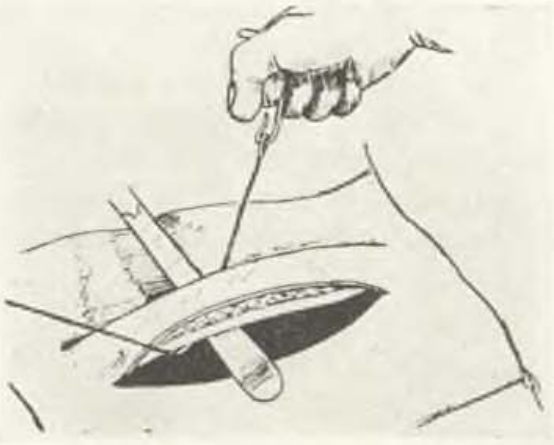

Fig. 3. Rib is sawn by means of Gillies' saw

stage of plastic surgery, the graft coalesces with the bone of the mother bed in the same way as fragments in a fracture in the same period of observation.

Thus it was possible to demonstrate that composed autograft in tubed flap is the most perfect plastic material from the point of biology, which may be transfered into any anatomic area of organism, if the indication is favourable.

In this article, there are more detailed studies especially of the surgical aspects of modeling and of migration of bone graft, incorporated in tubed flap.

We start the operation by two incisions of approximately 10 cm length, parallel with the upper and lower edge of the rib (fig. 1). The distance between the cuts must exceed width of the rib 3 — 3 and a half times. This affords prevention of skin stretching when tubulising the flap as this might lead to interruption of vessels in pedicle of soft tissues and might change the bone graft incorporated into the flap into a free one, i.e. might make the operation senseless. In cases when such a mistake was done in places with disturbed blood supply, there were observed places of bone tissue resorption, lacunes, padded osteoclasts and subsequent rebuilding of the bone.

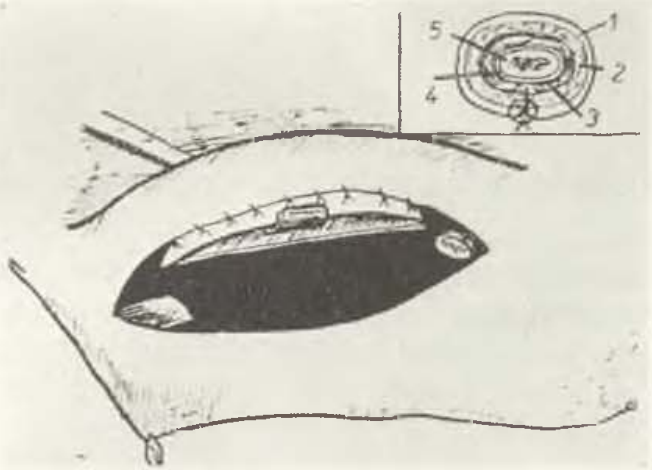


Fig. 4. Modeling of Filatov's flap with incorporated bone autograft. On scheme cutting of flap. The marking is the same as in fig. 1

Carefully, so as not to disturb the intimate connection of soft flap tissues with the bone we introduce between rib and removed pleura from one cut into the other.

With Gillies saw, introduced below the rib, we resect by two cuts a piece of bone of essential length. In this, important facts must be born in mind. When we approach the external cortical plate of the rib, the movements must be slowed down, so as to prevent the saw when entering soft tissues, to damage vessels of the nutrient pedicle. It is duty of the assistant to guarantee maximum immobilization of the resected piece of rib so as to exclude disturbance of the intimate connection of bone with soft tissues.

Under the incorporated bone graft we sew the edges of the skin flap (fig. 4) whereby the tubed flap is formed and the integrity of skin is reconstructed as in normal Filatov plastic surgery (fig. 5).

In order to shorten the period of reparative therapy, the so called "acute" flap is suggested, after its modeling we simultaneously cut off one of the nutrient pedicles immediately and carry out the first stage of migration.

The "acute" flap may be applied even if the bone autograft (cutting off the distal pedicle) is incorporated. When studying the morphological structures of bone graft incorporated into the "acute" tubed flap, we found no factors which might discredit this method.

Two weeks after grafting the pedicle of flap the next stage of migration may be carried out. Temporary disturbance of nutrition after cutting

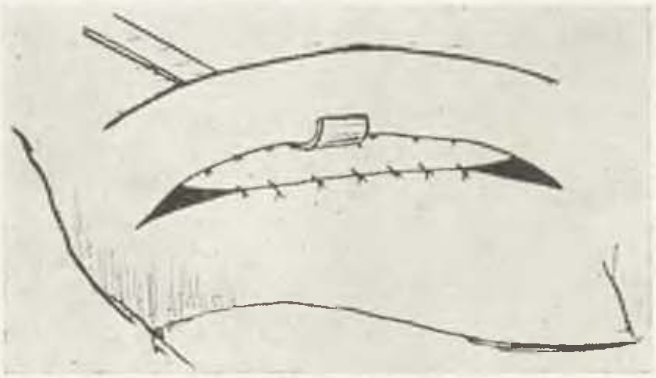

Fig. 5. Reconstruction of skin integrity under flap

off one of the flap pedicles and its transfer to the new place does not disturb the vitality of the incorporated bone graft and its ability to regenerate.

Surgeons, carrying out Filatov's plastic surgery undoubledly know cases, when for these or other reasons, the next stage of migration of tubed

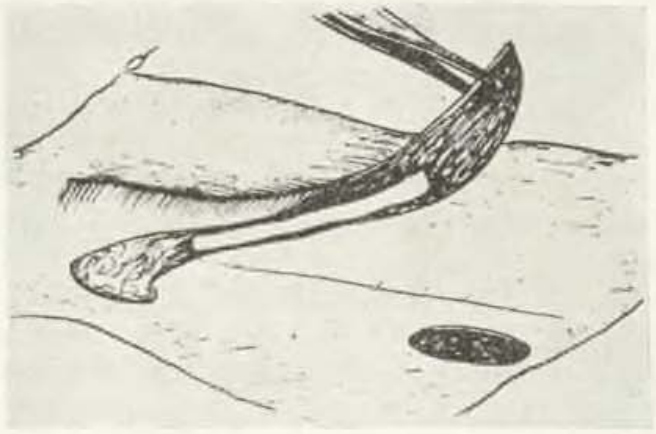

Fig. 6. Concluding stage of plasty. Nutrient pedicle is cut. The flap is spread

flap or the concluding stage of plastic surgery can not be carried out in time. These cases do not evoke fears in the surgeons, whether the tubed flap will remain suitable for plastic surgery for unlimited period. Such circumstances could not evoke lawful fears in the described method, when it is known that bone deprived of functional obligation, is gradually becoming more and more porose until complete resorption.

Studies of serial-graduate cuts of composed bone autograft in tubed flap in stages of migration after 3 months (3 months and 7 days), disclosed that along with partial resorption of fresh formed bone stroma, the bone tissues begin to form organic structure.

Thus some deviation from the planned stages of operational therapy in respect of prolongation of the stages does not reflect in the submitted method, in the results of plastic surgery unfavourably.

Fig. 7. Preparation of bed for graft

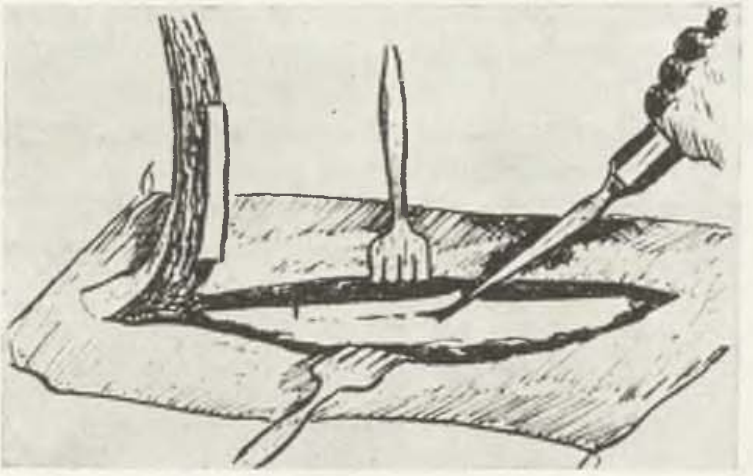

Fig. 8. Forming of wall defect in tibial bone

Of great importance for the favourable course, is the final stage of migration, which is the target of osteoplasty (fig. 6—9). Firm adherence of the incorporated bone autograft to the mother bed and its immobility are essential conditions. In those cases, when the graft was losened or when it did not adhere firmly to the mother bone, indirect osteogenesis and expansion of chondroid and fibrilar connective tissue, occured.

The concluding operation is the most traumatic and technically the most difficult. For this reason special care must be taken, that when sewing the pedicle to soft tissues of mother bed, no damage is done and the blood supply to the bone autograft is not disturbed.

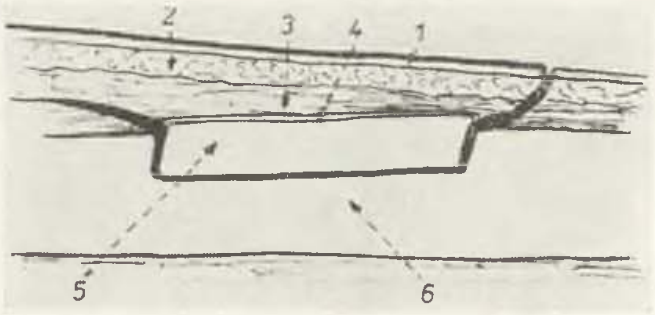


Fig. 9. Scheme of concluding stage of plasty. The defect of tibial bone is covered by bone graft incorporated in tubed flap

If all mentioned conditions are carefully maintained, it affords the possibility to the surgeon, to transfer the implanted bone autograft for a distance and to carry out plastic bone surgery by means of tubed flap, which yields the most favourable results.


SUMMARY

In order to work out methods affording transfer of composed bone autograft from one anatomic area to another one, 60 operations were carried out in 24 dogs.

Studies of 260 serial graduate preparates of composed bone autografts in tubed flap after 1 and 2 weeks, 1 month after modeling, after first and second transfer, after 1, 3 and 6 months after concluding stage of plasty.

It was stated that if the surgeon maintains all principles required for the described operations, the composed bone autograft in tubed flap remains alive and capable of regeneration, coalescing with the bone of mother bed in the concluding stage of plasty, just as fractions do in a fracture.



RÉSUMÉ

**La modélation et le transfer de la greffe osseuse composée dans le lambeau tubulé dans l'expériment**

I. L. Degen

Les auteurs ont entrepris 60 interventions chirurgicales chez 24 des chiens en somme pour prouver la meilleure méthode permettant le transfer de la greffe osseuse composée d'une partie anatomique sur une autre partie.

Il s'agit des données de 260 des échantillons histologiques graduels en série des autogreffes osseuses dans la lambeau tubulé pris dans la période de la première et deuxième semaine, d'un mois après la modélation, dans la période du premier et

du deuzième transfer et, enfin, dans la période du premier, du troisième et du sizième mois suivant la dernière étape de la plastie.

Les auteurs se sont persuadé que dans les cas, où le chirurgien garde toutes les règles auxquelles les interventions respectives doivent être soumises, l'autogreffe osseuse composée dans le lambeau tubulé non pas seulement reste en vie, mais, en plus, elle est capable de la régénération, se réunit avec le lit osseux maternal dans la dernière étape de la plastie tout en ressamblant au processus de réunion osseuse au cours de la fracture.


ZUSAMMENFASSUNG

**Modellierung und Übertragung des kombinierten Knochenautotransplantates im Rundstiellappen im Versuch**

I. L. Degen

Zwecks der Erarbeiterung einer Methode, die es gewährleisten würde, das kombinierte Knochenautotransplantat aus einem anatomischen Bereich in das andere zu verschieben, sind 60 Operationen an 24 Hunden vorgenommen worden.

Studium von 260 serienmässigen abgestuften histologischen Präparaten kombinierter Knochenautotransplantate im Rundstiellappen nach 1 und 2 Wochen, 1 Monat nach Modellierung, nach erster und zweiter Übertragung, 1, 3 und 6 Monate nach der abschliessenden Plastiketappe.

Es wurde festgestellt, dass — wenn der Chirurg die gesamten, für die beschriebenen Operationen nötigen Grundsätze einhält — das kombinierte Knochenautotransplantat im Rundstiellappen lebendig und regenerationsfähig bleibt, indem es in der Abschlussetappe der Plastik mit dem Knochen des Mutterbettes zusammenwächst ebenso wie die Bruchstücke bei Fraktur.



RESUMEN

**Modelado y translación del autotrasplante huesoso compuesto en el lóbulo tubular en experimento**

I. L. Degen

Con el objeto de elaborar el método que permitiría trasladar el autotrasplante huesoso compuesto de una zona anatómica a la otra se realizaron 60 operaciones en los perros.

El estudio de 260 preparaciones histológicas graduales de serie de los autotrasplantes huesosos compuestos en el lóbulo tubular dentro de 1 y 2 semanas, 1 mes después del modelado, al cabo de la primera y segunda traslación, dentro de 1, 3 y 6 meses después de la etapa final de la plástica.

Se determinó, que si el cirujano mantiene todos los principios necesarios para las operaciones descritas, el trasplante huesoso compuesto en el lóbulo tubular queda vivo y capaz de la regeneración, concreciendo con el hueso de la placenta en la etapa final de la plástica así como los fragmentos en la fractura.

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## The training of plastic surgeons in Czechoslovakia

The Czechoslovakian student usually enters the Medical Faculty of the University, at the age of 18 years. The studies of medicine take 6 years, first years are theoretical and 4 years are taken up by clinical studies. After having passed the state examinations the student gains the tittle of doctor of medicine (MUDr.). The young physician is liable to pass one year of circulation practice in surgery, internal medicine and gynecology with obstetrics. Men liable for compulsory military service spend one year in the army. Thus at the age of 25—26, the physician chooses his future occupation. Either he decides to study in some specialised branch or he spends further 3 years at the department of internal medicine and additional specialities as preparation for the work of a practitioner.

Specialised studies in each branch are set down by the Ministry of Health. Plastic surgery ranges the surgical superstructures, just as pediatric surgery, urology, neurosurgery, thoracal surgery and cardiovascular surgery. Training in these branches consists of 3 years stay at the unit of general surgery and is included by an examination of specialisation of I. degree. The superstructure branch requires further 5 years of studies, included by an examinaton of II. degree.

Five years of specialised studies in plastic surgery may be carried at University clinics and at specialised in- and out-patient department, headed by a qualified plastic surgeon. According to the Law of 1966 it is possible to include into 5 years of specialised studies a maximum of two years of activity at the qualified department of traumatology, orthopedics, maxillo-facial surgery or otorinolaryngology. Because frequently older surgeons apply for training in plastic surgery, with considerably longer practice than the prescribed 3 years, there remains for them three years training at a specialised unit plastic surgery.

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# NEUROFIBROMATOSIS OF THE HEAD

M. FÁRA, J. HRIVNÁKOVÁ, M. BREJCHA

Neurofibromatosis is a disease of the nervous system manifesting numerous incidence of tumours, placed in the different tissues and organs. It was for the first time reported by R. Smith in 1849 (1) but it was Recklinghausen in 1882 (2) who had his name included in the title of the disease, due to his meticulous studies of the individual manifestations. Localisation of neurofibromas on head or face represents, if these are affected to a greater extent, sometimes a difficult problem and at the same time carries some interesting observations especially on the skeleton. These observations we should like to deal with in this report in greater detail.

## INCIDENCE AND AETIOLOGY

It is an inborn disease and according to some authors predominantly hereditary (3). Others (1) maintain that the disease itself is not inborn that there is only disposition to it. The disease appears sporadically but we may also meet with familial incidence. Usually it is already present at birth, at other times it might not manifest till later, namely in puberty. There are different opinions on the frequency of incidence: some authors consider it to be a very rare disease, others claim that approximately one in 2.000 persons (1,3) is afflicated.

According to McCaroll (4) it is primarily a developmental disease of the entire nervous system. Kragh et al. (5) believe this disease to represent a form of neuroectodermal dysplasia with neoplastic tendencies. Škorpil (6) places neurofibromatosis amongst dysplastic diseases, classified with phacomatoses.

## CLINICAL PICTURE

The tumours may form anywhere on the body excepting volar aspects of hand and plantar aspects of foot. Their dimensions vary from millet size to almost gigantic formations. They are usually localized along the course of

Fig. 1. Nodular type of facial neurofibromatosis. — Fig. 2. Plexiform type of facial neurofibromatosis.

some nerves, including sympathic nerves. The finding differs very much in the individual cases and with this clinical differentiation also corresponds the different histologic picture. If cutaneous or subcutaneous nerves are affected we observe the tumour to grow in two types:

1. n o d u l a r (neurofibromatosis cutis), when we find in the skin, egg-shaped adjacent or pedicle tumours of softer or often more rigid consistency. Occasionally they may be found finally all over the body (Fig. 1).

2. d i f f u s e (neurofibromatosis plexiformis) which manifest in diffuse swelling of the affected body region and may often create a monstrous formation. The affected region either exceptionally increases in size — something like elephantiasis —, or the skin cover loosens over the tumorous tissue and sinks in form of variously large baggy masses in direction of its weight (Fig. 2).

The skin above the tumours might be of normal colour and consistency, but more often it is strongly pigmentated and there is excessive horning up to verrucose growth.

Besides this frequent hyperpigmentation of the skin cover of the tumours there are in neurofibromatosis — a usual and classical finding — differently sized pigmentations in form of light brown spots (spots "café au lait") which may be localized anywhere on the body.

Along the nerves of the spinal cord, the disease often manifests in form of corral nodules, which may cover the region of complete nerve segments (7).

In neurofibromatosis however, tumours may grow even in brain nerves and roots of the spinal cord. Also pelvis, gall bladder, vagina, all sorts of internal organs and all parts of the digestive tract, may be affected.

Besides the mentioned basic manifestations of the disease, still further changes which complete the picture on symptomatology of neurofibromatosis may be found: changes in the lymphatic system, especially frequent in diffused hypertrophies connected with elephantiasis, vessel changes (for ex. thick-walled vessels), disorders of hearing, which may be caused by the simultaneously occuring tumour of the eighth cranial nerve, or by penetration of the neurofibroma into the region of the cerebello-pontinic angle. Such affection of hearing is usually one-sided, whereas in the familial type of neurofibromatosis, both-sided nervous deafness may occur (3). The comparatively often described eye manifestations are usually the sequellae of inborn defects or a gradually acquired damage of the orbital walls, changes in the translucense of the optic canal, of the associated glioma of the optic nerve, or they are caused by the pressure of soft tissues in the orbital region grown through by tumours, upon bulbus. Sometimes in patients with neurofibromatosis there may be determined mental retardation (according to Davis et al. (1) 20 times more frequently than in other persons), epilepsy, spina bifida or even other inborn anomalies of the central nervous system. In rare cases there may simultaneously occur symptoms of disorders of the endocrinnic system in the sense of acromegaly, gynecomasty, infantilism etc.

The most frequent and variously placed findings, are changes in bones which may sometimes be quite unobtrusive, at other times large up to being bizarre. They may be proved in fifty and even more percent of patients with Recklinghausen's neurofibromatosis (8). They are mainly formed by numerous congenital anomalies, such as we observe at other times even in individuals without signs of neurofibromatosis. Some of the more often found types tend to oppose coincidence, causal connections were not proved however. This refers mainly to changes distant from the place of neurofibroma in soft tissues. If we assume that neurofibromatosis is formed as a dysplastic process, the presence of these anomalies is understandable.

Thus different types of cranial asymmetry in skull with defined bulging of some parts of skeleton or on the other hand with hypoplasia up to aplasia in some bones, are to be found especially in the region of orbita, so that it communicates widely with the cranial cavity (Fig. 3). The asymmetrical development of maxilla, mandibula and facial bone is the basis of asymmetry of the face.

On the spine the changes are most frequent, they form approximately ½ of all determined changes in bone. They are anomalies of vertebrae, especially hemivertebrae with subsequent angular skoliosis, possibly with simul-

taneous deformation of sternum and ribs or absence of epiphyseal parts on one side of the vertebral bodies. Skoliosis is the altogether most frequent bone change, but it is not always inborn and its origin is not easy to explain. Kyphosis and kyphoskoliosis predominate over simple skoliosis. In most of the cases occurence in the lower thoracical spine, being angular and sometimes secondarily worsened by unequal length of extremities. Along with skoliosis also spondylolisthesis was observed, possibly being conditional to congenital defect of pedicle. On the shoulder spine we observed repeatedly caninisation of vertebrae, i.e. shortening of the ventrodorsal diameter of the vertebral bodies, whereby their height is maintained and deepening of the rear edge of vertebral body, which previously was considered to be characteristic for the presence of the expanding process in the spinal channel. Amongst frequent findings should be cited spina bifida, cranial or caudal variation of spine, blocks in vertebral bodies, sometimes manifest symptoms of osteomalacia which may be the sequel to renal osteodystrophy due to congenital defect of the kidney channels.

On the extremities various authors observed anomalies in long and also in short bones in the sense of hypoplasia up to agenesis, their congenital bending (Fig. 4) and pseudoarthroses.

More interesting than the mentioned congenital anomalies are changes which occur in bones in the neighbourhood of the neurofibroma. If the tumor grows slowly for a long time, pressure atrophy may occur without any further reaction of the adjacent bone tissue. We observed for example thinning of the skull and even interruption of the zygomatic arch (Fig. 5), thinning of the mandible arm (Fig. 6), rims of the orbita, pressure atrophy of some processes of vertebrae on the cervical spine (Fig. 7), on the sitting bone thinning in region of the protuberance. Of the same origin may also be defects of the walls of orbita or optic canal or their enlargement. Sella is frequently — sometimes asymmetrically — enlarged (Fig. 8, 9). Sometimes, especially on the skeleton of the extremities, the bone reacts also by local periostal new formation, so that it changes somewhat its shape and its surface becomes rugged. At other times the neurofibroma may prove to grow into the bone as it grows into other surrounding tissues or organs (Fig. 10, 11).

Neurofibromas, which form on subperiostal or deeper branches, manifest — besides possible periostal reaction — as cystoidic radiolucent areas either superficially or in depth. The periosteum forms sometimes irregular layers above them. A more rare type of these cysts are the so called "pendulous periostal cysts" which usually take on the form of a shell-type oval shade (Fig. 12) and which after extirpation may show histologically the same composition as typical skin lesions with new formed bone lamellas in addition. If the cysts are more numerous, pathologic fracture may of course occur anywhere.

The most characteristic change of the skeleton in Recklinghausen's neurofibromatosis — besides congenital bending of tibia — is the abnormal growth of the bone, usually in the neighbourhood of the plexiform neuro-

fibroma. The growth is abnormal in the sense of localized hypertrophy, only if the epiphyseal cartilage is destroyed due to penetration of tumour from the vicinity — but this is not a rule — the bone remains short, yet it may be at the same time broader at the rim. More rare is accelerated ossification of the epiphyseal cartilage. The bone may be larger as a whole, or only in some sector.

On the flat bones of the skull we observed a thickening which in one patient amounted to approximately three times the thickness of normal calvaria.

The bone was condensed, thus yielding a very dense shadow without distinguishing external and internal laminae and diploë. Its surface is rugged and the contour is not sharp in the place where the tumour penetrates through (Fig. 13). In another patient, these changes were — especially in respect of the extent of thickening — considerably smaller, on the bone surface there were on the other hand rough separated spicules. In a further patient the antrum walls, proc. alveolaris and the lower shell, were thus thickened (Fig. 14). If these changes appear to a greater extent, leontiasis ossea results. It seems that a similar for of localised hypertrophy may be seen even on the pelvis.

The meningiomas and gliomas, often occuring in neurofibromatosis simultaneously, may calcify and appear on the skiagram in form of patchy shadows in negligible or even in peach size. Precise classification can be however only carried out after the patient had been operated on. We observed two such cases: in one patient it was a pendulous cyst emerging from the hypertrophic wing of the sphenoid bone, in another patient a number of ossifications was visible inside the skull, which after 24 years showed obvious growth and multiplication.

## HISTOPATHOGENESIS

The pathologists are not uniform on the question whether neurofibromas originate from the sheath of Schwann or from connective tissue around the nerves or possibly from mesoderm (6).

In nodular form each tumor usually appears at the end of some skin nerve and forms a nodule in the scar, with a fine cover of connective tissue. Its tissue is light and semitransparent and consists of homomorphous spindle-form cells, dispersed at unequal density. Sometimes it is possible to prove by special staining methods the originally affected nerve in the tumour. Our specimens were stained for this purpose according to Bodian.

In plexiform neurofibroma, we see macroscopically, clusters of interknitted long light string formations. They are nervous plexes which increased by diffuse proliferation of their cover in thickness and length. By microscope it is usually possible to distinguish nervous bundles with strongly thickened layers of perineurium from fibroblasts and vacuolized hydropic cells. In later

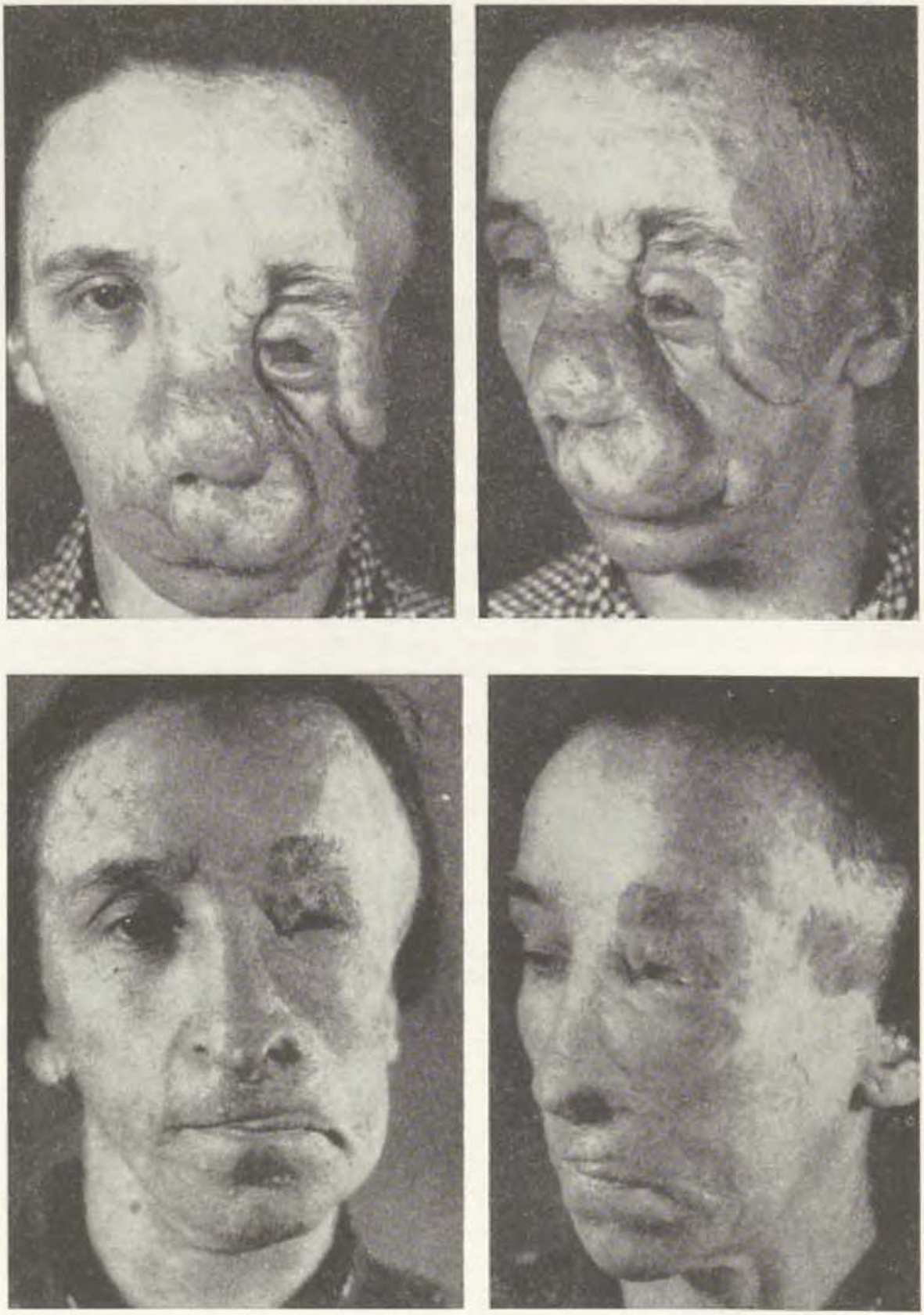

Fig. 15 a, b, c, d. In this patient, 23 partial operations were necessary before satisfactory results were achieved

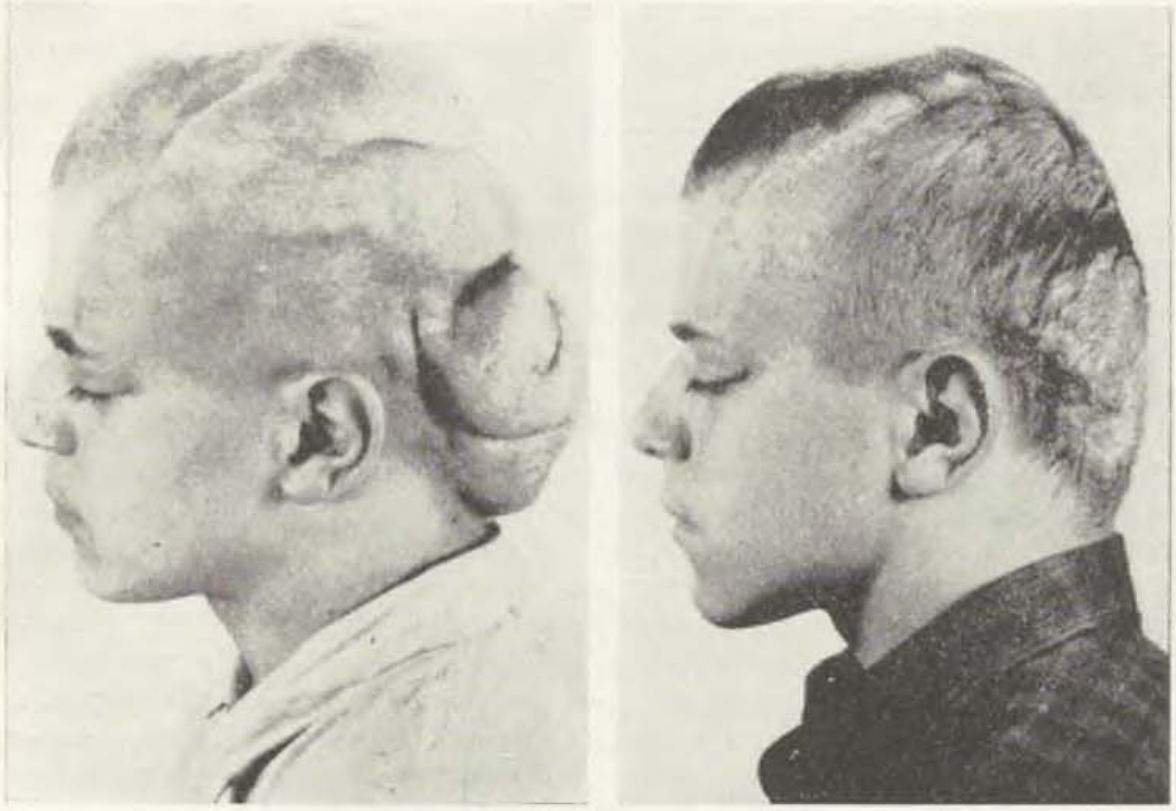

Fig. 16 a, b. In this patient the tumour was removed by a single operation. The bulge in the occipital region is due to hypetrophy of the bone base

stages or in reoperated tumours, this classic picture is obscured by associated changes.

Spots of the type "c a f é a u l a i t" manifest striking deposition of melanic pigmentation in the basal layer of epidermis.

## DIAGNOSIS

Usually we are able to state it in more developed stage of the disease, on first sight. In the n o d u l a r form we see several or many skin tumours which are adjacent or pedicular, of different consistency, usually not painful and often with hyperpigmentated or variously hyperplastic skin cover. In p l e x i f o r m tumours we find neoplastic formations joined with diffuse overgrowth of skin and subcutis even of bizarre shape. We feel here on palpation, hypertrophic nervous nodules, which slip elastically between the examining fingers. In both cases we usually find the mentioned light brown spots on various parts of the body. The lesions are often unilateral and blocked manifestations of neurofibromatosis in the central body line are considered by some authors to be a characteristic feature of the disease. Furthermore we must investigate by x-ray, whether there are frequent bone changes especially

in the affected part of body and in every case we should look for anomalies of skull and spine. Besides this, special examination of ears and eyes is essential.

## DIFFERENCIAL DIAGNOSIS

In the nodular form it is sometimes necessary to differentiate between the numerous incidence of fibromas, lipomas, xantomates, haemangiomas, lymphangiomas, fibrosarcomas, Hodgkin's disease and Pringl's fibroangiomic nerve. To the plexiform variety may resemble especially the large lymphangiomas, lymphoedemas and elephantiasis.

## PROGNOSIS

The disease has the character of changing progression. Neurofibromatose manifestations never disappear spontaneously, there may only temporarily appear signs of their slight recess, but often there are rather periods of more striking progression, when the tumours show obvious increase in size and number. This occurs especially in puberty and pregnancy. The growing tumours may mechanically suppress, deform and even clearly destroy the surrounding tissues and organs or grow into them, but the greatest danger is that the tumour may turn sarcomatous. This tendency is more frequent in large tumours and the frequency of turning malignant is reported in 8—16% of cases. In the past it was often thought that this is the consequence of irritation of neurofibromas by surgical interference, but this will not be correct. The probability of turning sarcomatous is rather believed to be proportional to the quantity of neurofibromatous tissue which should be therefore reduced by operation as much as possible. The sarcomatously changed parts of the tumour usually manifest by spreading rapidly in the region but even metastatic growth has been reported. The prognosis is then most unfavourable.

## THERAPY

It used to be recommended previously to carry out x-ray irradiation, but the results were not encouraging and it is therefore no being carried out any more. Only surgical therapy remains; its tasks are: to remove the largest part of tumour tissue possible, thus decreasing the possibility of turning malignant and to afford at the same time cosmetic benefit to the patient, because the frequently visible and mostly repugnant deformations exclude him practically from working and social life. Surgery is often most difficult here and satisfactory results are mostly only then achieved if operations were carried out in many stages. Yet often relaps or additional growths of the tumour remnants, must be counted with.

## THE PATIENTS

At the Clinic of Plastic Surgery in Prague, 61 patients with neurofibroma were operated on. Of them 18 had extensive tumours of Recklinghausen type on face and head. Their therapy required complicated and mostly multi-stage

surgical performance and it was possible to observe them during their repeated hospitalisation in greater detail; for this reason they became subjects of this report.

Localisation of the main affliction was 16 times in the face and twice on head and back of neck. Plexiform neurofibroma was more frequent (14 times) than nodular form (4 times). In the greater part of patients, the disorders were recognisable at birth. Familial incidence was only recorded 4 times (mother-son, son-mother-brother, father-son, sister-sister).

Clear ocular disorders which may be attributed to the basic disease were proved in 2 patients and in one patient there was one-sided deafness from obturation of auditory canal by the tumour and in two patients epilepsy was reported. Practically in all patients there was carried out complete x-ray examination of the skeleton of the whole body. Bone changes were proved in 17 patients, there were various types of asymmetry caused by hypoplasia and by atrophy of some facial or cranial bones, or on the contrary — periostal irregular growth or even hypertrophy, furthermore there were determined: pressure atrophy, sclerosis, craniostenosis, cysts, "pendulous" bone cysts, oval ossifications with a clear rim inside the neurocranium. Distant bone change manifested especially often in form of skoliosis, changes of vertebrae in the sense of dorsal excavation of the body or their caninisation, twice spina bifida, in single cases atrophy with bending of the processus of vertebrae, hypoplasia of fibula and periostal new-formation on the tibial bone.

In each patient, 6 operations in average were carried out, they took mostly a long time and were often also complicated from the point of supplementing blood losses.

In the nodular form it was endeavoured to remove each time as many nodular tumours as possible, totally excising also its skin cover. In diffused form surgical therapy was more difficult. In most cases the tumorous tissue had to be removed in parts, whereby the healthy muscle base and nerves, especially the motoric facial nerve had to be carefully preserved. Besides removing the tumour mass gradually, it was endeavoured from the start to maintain or renew the function of the individual formations, especially the entry gates to all sensual organs (eyes, nose, mouth, auditory passage) (fig. 15 a, b, c, d). Incisions in these operations were — just as in any other surgical interference in the face — made if possible in the natural groves and wrinkles, where they are hidden and become inconspicuous. No hypertrophy of scars occured in our patients and there were also never any complications in respect of healing, when neurofibromatosis was operated. Evident relapses in the place of the removed tumour mass occured in 3 patients.

The patients always suffered of a considerable feeling of inferiority and were very happy about each — even partial — interstage improvement of their deformation. When operating in the hairy part of the head, possibly in its back part, it was endeavoured to remove some — even quite extensive — plexiform tumours in a single operation, maintaining an adequate quantity of skin cover even at the price of possibly leaving a thinner unremovable

layer of neurofibromatous tissue on its basal part, definitely (Fig. 16 a, b). This procedure was taken after examining previously operated patients, when it was clear that extensive relapse from a small residue of neurofibromatous tissue left, was rarely to be expected and that a sarcomatous reverse could be hardly caused by its operational traumatisation. In none of the several times operated patients of the group occured malignancy. The only patient in which malignancy was determined, was operated only once, an already malignant formation of the right facial part was removed in one performance. Typical coffee coloured spots on the body had been on the patient since birth, the tumour existed since puberty. At the age of 82 the tumour started to enlarge somewhat and the patient underwent operation at the age of 84 years. When comparing this case with other repeatedly operated patients at the Clinic of Plastic Surgery in Prague, this is considered a confirmation of the opinion that a tumour left to itself for a long time may at any time even in old age appear malignant changes spontaneously and that it should be therefore removed in time.


SUMMARY

Heavy cosmetic sequellae and also the danger of sarcomatous development in patients with Recklinghausen's neurofibromatosis, requires radical surgical and yet from the esthetical point careful removal of the tumour tissue. This applies especially to lesions of the head, especially of the face. It may be mostly achieved only if operating in stages but the healing is usually good and the satisfaction by the physician and also by the patient on the achieved results, is considerable. According to experience at the Clinic of Plastic Surgery in Prague and at other work places, it is not probable that traumatisation of neurofibromas by operation should support malignancy. On the contrary malignant development is approximately proportional to the quantity of existing tumour mass and it is therefore advisable to reduce it as much as possible. The possibility of sarcomatous development should be watched by examining histologically all removed tissues with the greatest care.



RÉSUMÉ

**Neurofibromatose de la tête**

M. Fára, J. Hrivnáková, M. Brejcha

Une grave faute cosmétique de même que le danger du développement sarcomateux chez les malades atteints de la maladie de Recklinghausen — la neurofibromatose — exige du chirurgien une excision radicale du tissu de tumeur, mais cette excision doit être en même temps minutieuse en regard de l'esthétique. Cette règle doit être respectée surtout quand il s'agit des tumeurs de la tête et de la face. Dans la pluspart des cas le résultat favorable ne peut être obtenu que par les interventions en étapes, mais la guérisson est presque toujours favorable si bien que le médecin et le malade sont contents du résultat respectif. Les expériences de la clinique de la chirurgie plastique de Prague de même que des autres chirurgies plastiques affirment qu'il n'y a point de possibilité d'aggravation de la maladie par le traumatisme répété des neurofibromes en suite de l'intervention chirurgicale.

Au contraire, le danger de la malignité dépend du taux du tissu tumureux respectif si bien quíl est recommendable de diminuer celui-ci autant que possible. La possibilité d'apparition de la malignitê doit être toujours controlée par la biopsie de chaque tissu enlevé.


ZUSAMMENFASSUNG

**Neurofibromatose des Kopfes**

M. Fára, J. Hrivnáková, M. Brejcha

Die schwere kosmetische Erkrankung und die Gefahr einer sarkomatösen Entartung bei Kranken mit Recklinghausenscher Neurofibromatose erfordern von den Chirurgen radikale und vom ästhetischen Gesichtspunkt sorgfältige Entfernung des Geschwulstgewebes. Das gilt in erhöhten Mass für die Erkrankung des Kopfes und besonders des Gesichtes. In meisten Fällen ist dies lediglich durch Etappenoperationen zu erzielen, die Heilung ist jedoch gut und die Befriedigung des Arztes und der Patienten durch die gewonnenen Ergebnisse gross. Laut der Ergebnisse der Klinik für plastische Chirurgie in Prag und anderer Arbeitsstellen ist es nicht wahrscheinlich, dass die durch Operationseingriffe vermittelte Traumatisierung der Neurofibrome das Auslössen von Malignität fördern konnte. Im Gegenteil, die Gefahr der bösartigen Entartung dürfte wohl dem Quantum der existierenden Geschwulstmasse angemessen sein und deshalb ist es richtig diese möglichst weit zu reduzieren. Die Möglichkeit der sarkomatösen Entartung ist durch folgerichtige histologische Kontrolle aller entfernter Gewebe zu verfolgen.

RESUMEN

**Neurofibromatosis de la cabeza**

M. Fára, J. Hrivnáková, M. Brejcha

La afectación cosmética grave y el peligro del cambio de sarcoma en los enfermos con neurofibromatosis Recklinghauseni supone de los cirujanos la radical y al mismo tiempo desde el punto de vista estético cuidadosa remoción del tejido de tumor. Esto está en vigor en grado aumentado en la afectación de la cabeza y sobre todo enla de la cara. Las más veces es posible alcanzarlo solamente por operar en las etapas, pero la cicatrización suele ser buena y la satisfacción del médico y la del paciente con los resultados obtenidos suele ser considerable. Según las experiencias de la clínica de anaplastía en Praga y de otros lugares de trabajo no es probable que la traumatización de los neurofibromas por las intervenciones de operación fomentaría el principio de la malignidad. Por el contrario el peligro del pervertimiento maligno será proporcionado a la cantidad de la substancia existente de tumor y por eso es justo reducirla lo más posible. La posibilidad del pervertimiento de sarcoma es necesario seguir con la investigación histológica consecuente de todos los tejidos eliminados.


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*Continuation from the page 140*

The frame-work of 5 years of specialised training:

2 years of facial surgery, hand surgery and burns treatment
2 years of reconstructive surgery and cosmetic surgery
1 year of pediatric plastic surgery.

The training in plastic surgery is concluded by an examination of attestation of II. degree before a Comitee of Postgraduate Medical Institut under the chairmanchip of a professor of plastic surgery. Further members of the Committee are: a representative of the Institut, representative of the Ministry of Health and the tutor, usually chief of the clinic or department, where the physician worked. Programm of the examination is set down by the Ministry of Health and has been elaborated by the Section of Plastic Surgery of Medical Society J. E. Purkyně.

The examination consists of a theoretical and practical part. In the theoretical part questions on general problems (for ex: grafting of tissue) are asked, whereby stress is paced upon knowledge of the literature. Furthermore the candidate must deal with 2—3 questions on specialities of plastic surgery, he must prove knowledge of one World Language according to his own choise and he is examined in public health policy and organisation. In the practical part the candidate analyses some medical cases suggesting their therapy and carries out one or two operations.

The candidate submitts to the Comittee a list of his work, stating the operations carried out, the scientific papers and recommendation of the instructor.

Having succesfully passed the examination he has the possibility of getting into the higher pay roll, of further scientific and pedagogic development, he is qualified to carry out the function of consultant or advisor or head of the department of plastic surgery for in-and-out-patients or to be in charge of a specialised unit for burned patients.

In order to achieve specialisation in plastic surgery, the following stages must be passed:

| | | |
|---|---|---|
| Basic and grammar school | 12 years .... | up to age of 18 years |
| Medical Faculty | 6 years .... | up to age of 24 years |
| Men: compulsory military service | 1 year .... | up to age of 25 years |
| Compulsory general medical training | 1 year .... | up to age of 25 years |
| Basic surgery | 3 years .... | up to age of 28-9 „ |
| Special plastic surgery | 5 years .... | up to age of 33-34 „ |

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# TUMORS OF THE SKIN
## Considerations on total excision

I. PITANGUY, E. T. TORRES

Inadequate excision of malignant tumors of the skin is still a problem for surgeons and pathologists.

A poor excision may lead to tumor reccurrence and even imperil the patient's life. The uncontroled large ablation will produce an unnecessary large defect. This control must be effected by the pathologist, preferably by the frozen section technique.

For 15 years we have been examining skin tumors, operated at the 38$^0$ Infirmary of the Santa Casa de Misericórdia do Rio de Janeiro and Clínica Plástica e Reconstrutora Ivo Pitanguy and up to now we completed 1.000 cases.

In clinically benign cases we employ paraffin sections stained by hematoxylin and eosin and, in few instances, special staining were necessary. When suspicion of malignancy is evidenced, the tumor is removed under control of immediate frozen sections stained by Terry's "polychrome methylen blue" process.

During these years, as far as malignant tumors are concerned, the removal of further skin in 8.5 % of the cases was necessary, that is, in 8.5 % of our cases the removal of malignant tumors of the skin was insufficient. Skin tumors, because of its accessibility, may be examined and diagnosed preciously and it treated adequately a great percentage of good results may be obtained.

A common aspect of a neoplastic face lesion is shown and the lines at excision are represented (Fig. 1).

The tumoral lesion is taken out surrounded by skin and underlying tissues, apparently normal (Fig. 2).

For many years, pathologists were satisfied in doing one single section through the middle of the tumor (Fig. 3) for an histological diagnosis and to determine the limits of neoplastic invasion.

Inadequancy of this method is easily evidenced for malignant tumors grow centrifugally, and one can not establish the total limits of the tumor invasion by this system.

Glass, Spratt and Perez-Mesa declare that 3.5 % of the malignant tumors of the skin are inadequately excised. They advise a method (Fig. 4) where four sections are made to obtain a larger area of control by microscopy. This process is still unsatisfactory, as was said before, for large areas infiltrated by a malignant tumor would not be detected.

In a recent paper, Madsen advised sections parallel to the skin surface. This method is time consuming and the microscopical interpretation is rather difficult in our point of view.

Fig. 1.

For two years we have been experimenting a method we believe extremelly reliable and simple, needing three sections that can be easily done in the freezing microtome. A skin tumor is usually removed with a good margin of skin. Apparently free of tumoral infiltration, this margin in our specimens usually varies from 2 to 12 mm, the same limits observed in depth.

Fig. 5 shows our sectioning method, done over the freezing microtome. The first section includes a whole side of the specimen; the second section comprehends the other side and a third section is done through the middle of the tumor, like in figure 3.

Figure 4 represents the same sections, from a different angle. Thus, the pathologist has a definite control of both sides, from one extremity of the

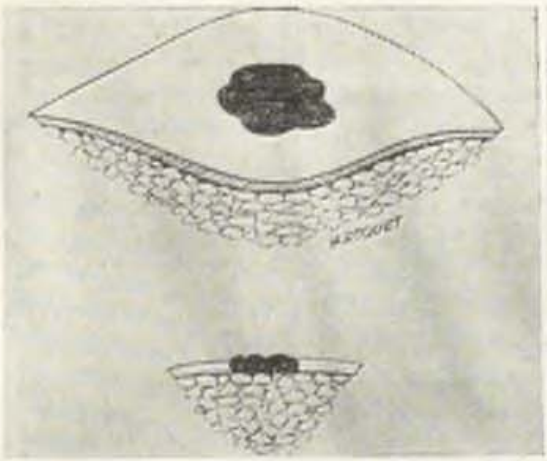

Fig. 2.

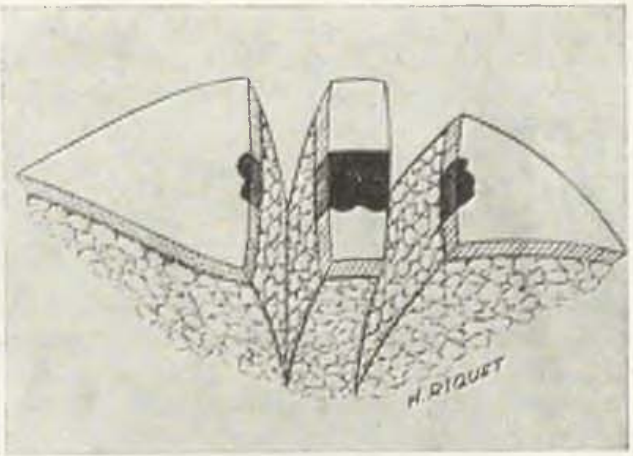

Fig. 3.

specimen to the other and sign of neoplastic infiltration can be easily disclosed.

While doing the sections, the pathologist must bear in mind the orientation of the specimen to tell precisely the area or areas in which there is tumoral propagation and advise the surgeon the point where further skin ablation will be necessary.

We have now examined 30 cases by this method, with a follow-up varying from one to two years, with no signs of reccurrence.

All 30 cases were examined by frozen section technique and paraffin blocks and filing purposes.

In cases of basal cell carcinoma, 5 mm of apparently normal skin around the tumor is usually satisfactory, in surface and depth.

In cases surgically mistreated or treated by roentgentherapy the tumor infiltration areas are larger.

We have observed more extensive infiltrations in cases of squamouscell carcinoma.

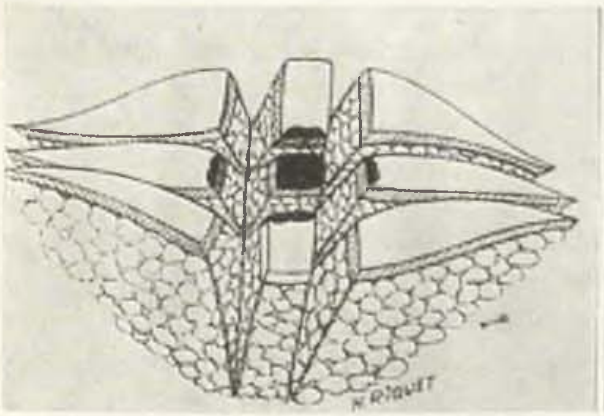

Fig. 4.

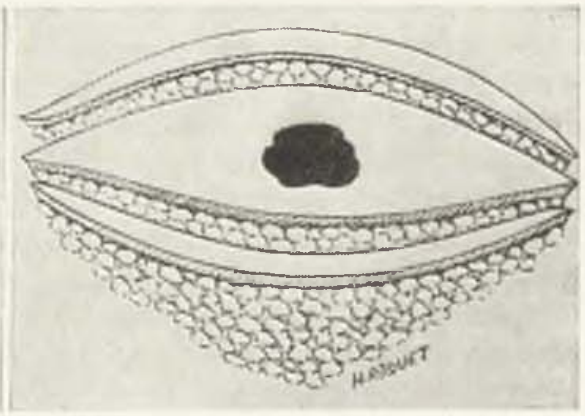

Fig. 5.

When dealing with melano-epitheliomae, is common knowledge the need for excision of the tumor with a wider skin area and immediate microscopical examination.


RÉSUMÉ

**Les tumeurs de la peau — les opinions touchant leur excision totale**

I. Pitanguy, E. T. Torres

Les auteurs décrivent la méthode de l'excision totale des tumeurs de la peau, suivi de la biopsie. Les auteurs soulignent la nécessité de l'orientation précise des échantillons, la biopsie doit comprendre même les contours de tumeur pour donner la sureté de l'excision totale.

ZUSAMMENFASSUNG

**Hautgeschwulste — Ansichten auf die total Exzision**

I. Pitanguy, E. T. Torres

Der Artikel beschreibt die Methode der totalen Exzision kutaner Tumoren unter Kontrolle durch gleichzeitige histologische Untersuchung. Es wird auf die genaue Orientierung des Präparates Gewicht gelegt. Die Untersuchung erfasst die Ränder der Geschwulst und gibt Sicherheit über ihre totale Exzision.

RESUMEN

**Tumores de la piel — opiniones sobre la excisio total**

I. Pitanguy, E. T. Torres

En el artículo se describe el método de la excisio total de los tumores de la piel controlada al mismo tiempo por el examen histológico. Se acentua la orientación precisa del preparado, el examen encuentra los bordes del tumor y de la certeza de su excisio total.


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# NEW METHOD OF PLASTIC OPERATION OF PHARYNGOESOPHAGEAL TRACT IN CASE OF EXTENSIVE LARYNGECTOMY BECAUSE OF CANCER

L. A. LUKOVSKYI, G. M. TYTAR

Broad application of sulphonylamid preparatives and antibiotics in surgical practice and the simultaneous development of anesthesy and blood transfusions increased the possibilities of effective struggle against ligature infection with heavy post-operative complications in the event of laryngectomy, and contributed to its broader use in medical practice widening substantially the indication of this operation.

Recently, laryngectomy became a broadly used treatment in case of high stage cancer of larynx, where it is necessary, for saving the life of the patient, to remove together with larynx also the affected parts of neighbouring organs en bloc: namely of pharynx, esophagus and tongue root, pharyngeal hypophysis, and also metastases in lymphatic nodes of the neck at one or both sides according to Krayl (N. A. Karpov, 1956; N. M. Arbuzov, 1958; A. I. Kolomiychenko, 1959; 1959; M. L. Sanotskyi, 1959; I. J. Sendulskyi, 1959; N. D. Khodyakov, 1959; M. G. Baradulina, 1963; S. I. Mostovoy, 1964; et al.).

Broad use of these operations generated, however, a new problem. As has been known, a large defect of the frontal wall of pharynx and esophagus arised as result of these operations which, until now, has not always been effectively covered during the operation. Consequently, a major part of surgeons thought it suitable to shape a permanent pharyngoesophagostomy already during the laryngectomy (N. M. Arbuzov, 1959; M. G Baradulina, 1962; A. N. Kravchuk, 1962; M. V. Sokolyuk and M. L. Senotskyi, 1963; Raven, 1952; Conley, 1963; Dworacek, 1956; Glaninger, 1960, et al.).

The result was that, as a rule, they covered such a broad pharyngoesophagostomy by inner plastic treatment with the aid of Filatov migrating skin flap and, more rarely, by means of local neck tissues. The most perfect method of such secondary plastic operation is, no doubt, the method elaborated by Prof. F. M. Khitrov, who was awarded the Lenin Prize, and his disciples — F. S. Molchanova and others.

However, coverage of broad pharyngoesophageal defects by means of different secondary plastic operations needs, as a rule, a long time, the patients losing many months in waiting for the following stage of operation.

Simultaneously with broad, wide open defects of pharynx after performed extensive laryngectomy, the patients suffer also from the tracheotomic cannula, which brings about pain, maceration of skin about the tracheostomy, growth of bleeding granulations, decubiti of walls of trachea and other complications.

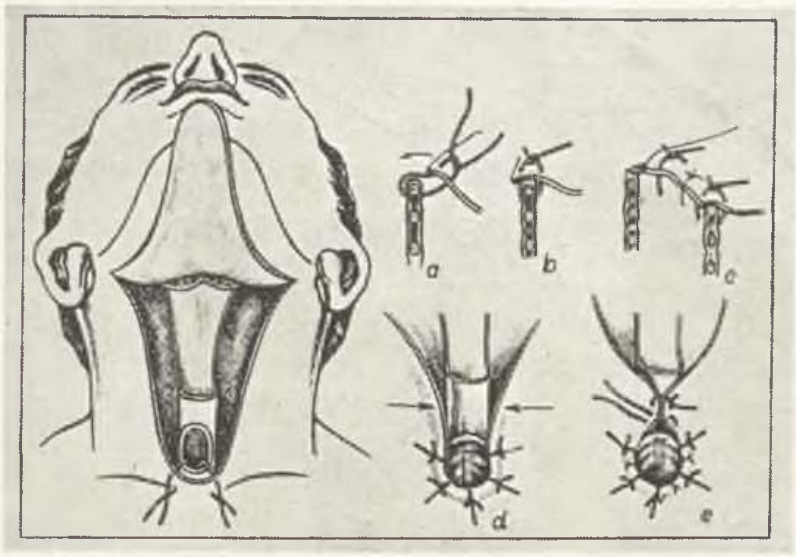


Fig. 1. A diagram showing the performance of the tracheostomy.

In connection with this problem, the Otorhinolaryngological Clinic of the Dnepropetrovsk Medical Institute studied with much effort the question and the methods of primary plastic reconstruction of the pharyngoesophageal tract during performance of wide laryngectomy, this together with completing the method of a secondary plastic operation of the pharyngoesophageal tract using the Filatov flap.

Between 1959 and 1965, we elaborated two methods of primary plastic reconstruction of the frontal wall of pharynx and esophagus during extensive laryngectomy, which enabled us to reduce, in many cases, the time needed for hospitalization of such patients.

*First Method. Reconstruction of the Frontal and Side Walls of Pharynx and Esophagus by a Tongue-Like Flap with Creation of a Small Pharyngo-esophagostomy, according to G. M. T y t a r*

Performing the task of plastical reconstruction of the frontal and side walls of pharynx and esophagus during extensive laryngectomy according to G. M. T y t a r, we led a tongue-like cut, proceeding from the angles of the lower jaw towards jugulum, separating afterwards a tongue-like, skin- and muscle-fascial flap. In this way, we created a broad operative zone. Thereafter, it was possible to remove quickly the larynx and to carry out, if necessary, even the two-sided operation according to K r a y l without additional incisions (Fig. 1).

After removal of the tumor, we used the tongue-like flap on the frontal part of the neck which, in its lower part was not covered with hair, to shape and form the frontal and side parts of walls of the pharyngoesophageal tract.

At first, it was necessary to create a tracheostomy, the front wall of hypopharynx and a not too great pharyngoesophagostomy in accordance with the following plan.

The stump of trachea was cut obliquely to have the shape of an end of

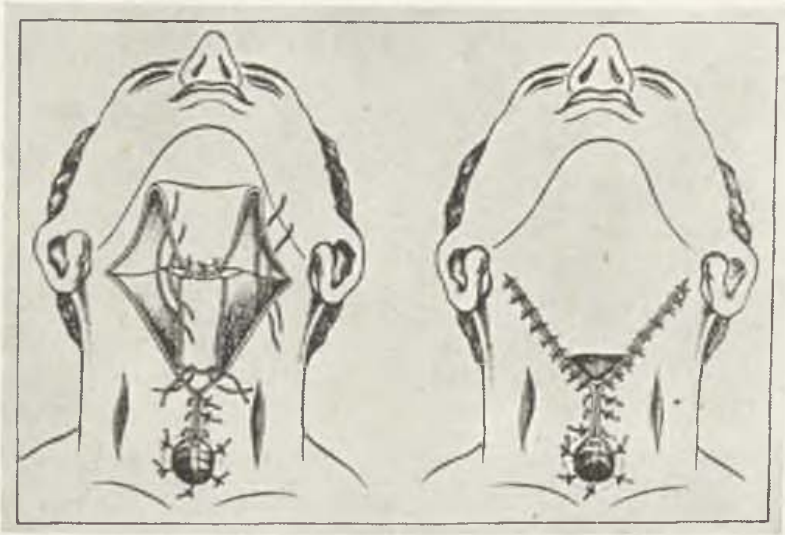

Fig. 2. A diagram illustrating the plastic creation of the front wall of the lower part of pharynx and of a small pharyngoesophagostomy.

a clarinet mouth piece. If the trachea diameter was not too great, we cut 2 to 3 forward upper rings of the trachea, obtaining thus a sufficient extension of the trachea stump. Suturing of the trachea to the skin was carried out by means of thin, vertical mattress suture, the edges of the trachea being punctured once while the skin edge of the wound was punctured twice (Fig. 1a). Normal knotted sutures of thin lawson thread or horsehair (Fig. 1b) were placed in the gaps between the vertical mattres sutures on mucosa and skin. These sutures secured coverage of the wound on the surface of the upper incision of trachea by means of the skin flap (Fig. 1 c). These measures protected the surface wound from penetration of sputum and from infection, securing the orifice from extending, because they held well the wound edges. The ventrodorsal edge of trachea was sutured to the skin edges of the wound by means of vertical mattress sutures in the shape of V. (Fig. 1e). With application of such sutures, the skin edges of the wound firmly contacted a large surface both mutually and of the rear wall of trachea, which contributed to the healing of the wound about the tracheostomy per primam.

Upon suturing the trachea to the lower angle of the wound, the skin was lightly spread and sewed above the tracheostomy (Fig. 1d and e). If there was too much tension, we made a lightening incision in the skin at a distance of

4 to 5 cm from the edges of the wound, through which mull drains were led (Figs. 2, a and b).

The lower free end of the tongue-like skin- and muscle-fascial flap which was free from hair, was turned backwards and sutured by means of catgut knotted suture to the remaining parts of the tongue and to the edges of the rear wall of pharynx. In this way an inner skin lining of the newly formed frontal wall of the hypopharynx was created (Fig. 2a).

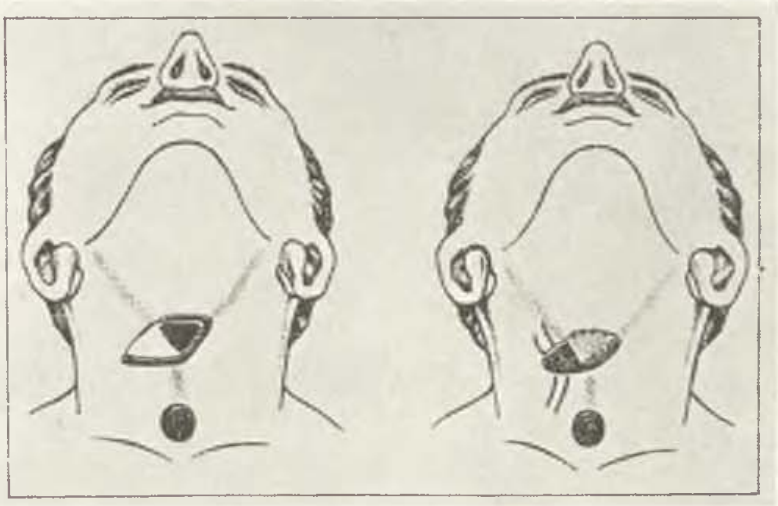

Fig. 3. A diagram showing plastic coverage of the pharyngoesophagostomy with the aid of local tissues.

The edges of the upper part of the flap, covered with hair, were sutured by means of silk, horsehair or polyamid thread to the outer skin edges of the wound in the zone of chin. The skin on the newly formed, frontal part of the neck remained, as a rule, sufficiently free, making frequently even folds. Later, it might be used for coverage of the small esophagostomy. The upper edge of the remaining frontal of the esophagus was sutured together with the skin edges of the wound, creating thus a small pharyngoesophagostomy (Fig. 2b), through which a probe was led for the nutrition of the patient.

In order to prevent hematomas beneath the skin flaps in the sub-jaw zone, we applied, during the first 24 hours, a compressive bandage. Ligatures were removed within 10 to 12 days. Almost regularly, the wound was healing per primam. During the seven days after operation, we served antibiotics to the patient.

Within 20 to 25 days after the surgical intervention we proceeded with the second stage of operation, i.e. the final coverage of the pharyngoesophagostomy by means of the local tissues from the neck.

We led a circular incision about the pharyngoesophagostomy, cutting not a too large skin flap from the left, or the right, which was raked with its wound surface upwards to cover the pharyngoesophagostomy, being sutured by means of catgut, knotted suture to the inner edge of the pharyngoesophagostomy (Fig. 3).

The skin surface of this flap formed the inner skin lining of the covered defect. A second skin flap was cut from upwards, above the opening, being transposed downwards, to the wound surface of the first flap (Fig. 4). After its suturing to the outer edges of the pharyngoesophagostomy opening, we covered same definitely. Skin defects at place wherefrom we took away the flaps were drawn together with silk or polyamid sutures. In order to be able to nourish the patient through nose, we inserted a thin, rubber or chlorvinyl

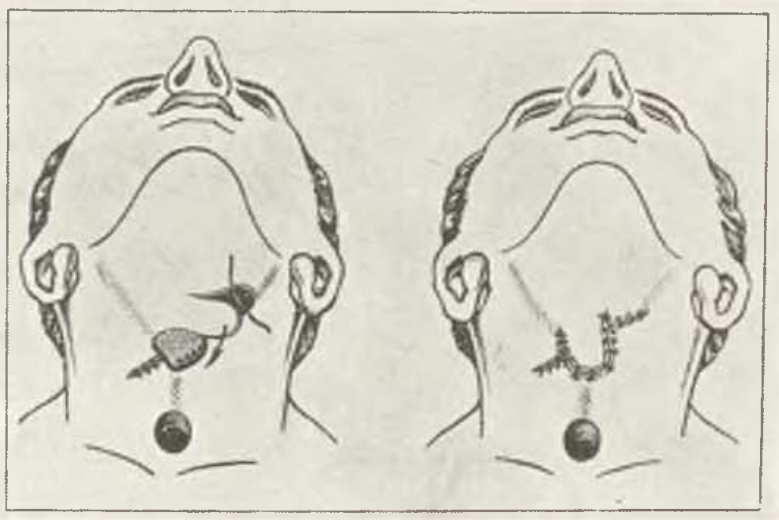

Fig. 4. A diagram illustrating plastic coverage of the pharyngoesophagostomy with the aid of local tissues.

tube. Ligatures were removed within 7 to 8 days and after 10 days we removed the nutrition probe from the esophagus. The patients started to take nutrition per os, at the beginning in liquid state. Some patients were nourished parenterally in this stage of their plastic operation (during seven to ten days). During the eight to tenth day after operation, we used post-operative therapy by radiation.

In this way we performed the operation in case of 42 patients, suffering from cancer of the third and fourth stages of their illness.

A major part of these patients went through a radiation therapy before operation for the purposes of devitalisation, the dose of which amounted from 3000 to 4000 r.

In case of 34 patients, the wound healed both in the first as well as in the second stage of operation, i.e. the plastic reconstruction of pharyngoesophageal tract, per primam, in case of 6 patients the ligatures split wide open and the suture about the tracheostomy decayed. Due to healing per secundam and creation of scarred coats about the pharyngostomy, we proceeded with the second stage of operation not after 20 to 25 days after the laryngectomy, but only within 2 at 2 and half months.

Patients who received large doses of radiotherapy before their operation (7000 to 8500 r) suffered all from decay of the suture with following necrosis

of the wound edges and formation of vast pharyngoesophagostomies which had to be covered by secondary plastic operation with Filatov flap according to F. M. Khitrov. One patient had to stay at our Clinic for the purposes of undergoing all stages of his plastic operation (coverage) 5 months, while another stayed there 12 and half months.

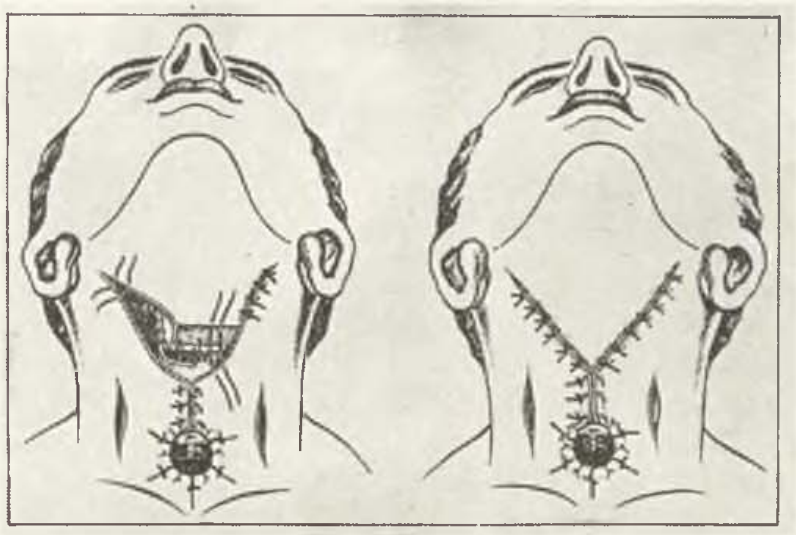

Fig. 5. A diagram showing the one-stage formation of the front wall of esophagus.

*Second method. Creation of Frontal Wall of Pharynx and Esophagus in the Course of Extensive Laryngectomy by Means of Primary Plastic Operation (without Creating Pharyngoesophagostomy) according to L. A. Lukovskyi and G. M. Tytar.*

When using this method, we first sutured the lower edge of the tongue-like flap to the edges of the tongue defect, as was already described supra. Thereafter, following the suggestion of L. A. Lukovskyi, we took a strip of skin coverage in the papillary layer, of a width of 1 to 1,5 cm (Fig. 5), at the place of bend of the skin- and muscle-fascial flap. In this way we apparently created two flaps, connected mutually at the surface with a layer from which the epidermal cover was formerly removed. The rear skin flap was without hair: it was sutured to the edges of the tongue defect. We used here catgut knotted suture. At the same time, it was also sutured to the edges of the pharynx and esophagus defect (Fig. 5a). This portion of the tongue-like flap formed the inner skin lining of the front wall of the pharynx and esophagus. The front flap was sutured with polyamid knotted suture to the side wall edges of the wound (Fig. 5b). At the same time, the wound surface on the neck was covered. A compressive bandage was applied to the suture. After 24 hours, it was replaced by a normal bandage. In the first 8 to 10 days, we applied a 40 per cent. solution of glucose at 20 ml per day to the patients intravenously and a 5 per cent. solution of glucose as well as a 0,85 per cent. physiological solution of NaCl and, in addition, aminopeptide-2 or hydrolysine L-103 at 500 ml,

twice within 24 hours, subcutaneously. Polyvitamins were also applied. In cases of urgent need, we used repeated blood transfusion, applying antibiotics (peniciline, streptomycine). Skin ligatures in the zone of chin were removed after 8 to 10 days, while ligatures about the tracheostomy were removed within 12 to 14 days.

This method was used for performing the operation of 53 patients, suffering from the third fourth stages of cancer of larynx.

The pharyngoesophageal wound of the major part of patients of this group (36) healed per primam. At the end of first month after the laryngectomy, the patients were released and could go home. We should like to add, that none of these 36 patients underwent a radiation therapy prior to their operation.

In case of 9 patients, the individual ligatures above the tracheostomy as well as in the zone of the chin decayed which was followed by parting of the wound edges. Small fistules, which arose in this connection, healed automatically per secundam. Owing to decay of the suture of 8 patients, small esophagostomies were formed at the place of the bent of the tongue-like, skin and muscle-fascial flap. In five cases, these esophagostomies were covered by plastic treatment with the aid of local tissues, while in three cases with the aid of secondary suture.

Of the seventeen patients, to whom the ligatures were cut and whose edges of the wound were parted, 12 underwent a radiotherapy prior to their operation with doses ranging between 2000 to 3500 r.

## CONCLUSION

1. The demonstrated tongue-like incision, used in case of extensive laryngectomy (in accordance with G. M. Tytar), creates a broad operative zone for free removal of larynx together with adjacent affected organs and for removal of one-sided or two-sided metastases in lymphatic nodes of the neck in accordance with Krayl.

2. Reconstruction of frontal and side walls of pharynx and esophagus by means of a tongue-like flap from the frontal part of the neck in accordance with G. M. Tytar, enables to create — during the extensive laryngectomy — a large part of the pharyngoesophageal tract with a small pharyngoesophagostomy which is there after covered, within the shortest time possible, with adjacent tissues. This method is recommended in cases of reduced nutrition, of the skin coverings of the neck, particularly in case of cachectic patients after same underwent a radiation therapy in doses, ranging between 4000 and 4500 r., prior to their operation.

3. Primary plastic operation of the pharyngoesophageal tract in accordance with L. A. Lukovskyi and G. M. Tytar, during which — in the course of extensive laryngectomy — we at the same time created the frontal and side walls of the pharyngoesophageal tract by means of a tongue-like, skin and muscle-fascial flap without pharyngoesophagostomy, is recommended in case of large defects of the frontal wall of pharynx and esophagus, provided the state and condition of the skin at the front part of the neck is good.

4. The presented new methods of plastic reconstruction of pharyngoesophageal tract in the course of exensive laryngectomy, reduce several times the time of hospitalization of such patients and enable to extend the indication of laryngectomy in the event of cancer of larynx reaching the third or fourth stages of the disease.


SUMMARY

The authors describe two new methods of plastic operation of pharyngoesophageal tract in the course of extensive laryngectomy because of cancer, reducing several times the stay of patients in hospitals. They state details showing successful application of this methods on 92 patients, who underwent operative treatment of their disease, the cancer of the third and fourth stage.

RÉSUMÉ

**Une nouvelle méthode de la plastie pharyngooesophagéale au cours de laryngueectomie faute du cancer**

L. A. Lukovskyi, G. M. Tytar

Deux nouvelles méthodes de la plastie de la voie pharyngooesophagéale au cours de laryngueectomie faute du cancer accourcissant significamment le séjour des malades respectifs dans les hôpitaux. Les données de l'emploi de succès de ces méthodes chez 95 des malades traités par l'intervention chirurgicale de l'oesophage du IIIème et IVème stade de la maladie vient d'être présentées.

ZUSAMMENFASSUNG

**Neues Verfahren für die Plastik des pharyngo-ösophagealen Weges nach ausgedehnter Laryngektomie wegen Krebs**

L. A. Lukovskyi, G. M. Tytar

Es werden zwei neue Methoden für die Plastik des pharyngoösophagealen Weges nach ausgedehnter Laryngektomie wegen Krebs beschrieben, die den Aufenthalt von Kranken mit dieser Erkrankung in Anstaltsbehadlung vielfach verkürzen. Angaben über die erfolgreiche Anwendung dieser Methoden bei 95 Kranken nach operativer Behandlung der Luftröhre im III. und IV. Krankheitsstadium sind angeführt.

RESUMEN

**Nuevo modo de la plástica del camino faringoesofageal en laringectomia por el cáncer**

L. A. Lukovskyi, G. M. Tytar

Se describen dos métodos nuevos de la plástica del cámino faringoesofageal en laringectomia extendida por el cáncer, los que abrevian muchas veces la estancia de tales enfermos en la asistencia de hospital; se describen las indicaciones sobre el empleo lleno de éxito de estos métodos en 95 enfermos en el tratamiento operativo del cáncer de la laringe en el tercero y en el cuarto estadio de la enfermedad.

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# THE TASK OF SEX AND AGE IN FORMATION OF DUPUYTREN'S CONTRACTURE

A. KIPIKAŠA, I. GREGOROVÁ

The ethiology of Dupuytren's contracture (further DC) has been the subjects of research and discussions ever since the times of Dupuytren's report. Within almost one and a half centuries, many theories have been brought forward. Not one of the theories however, has been completely contradicted, nor has any of them succeeded in being accepted as fully valid.

Oldest is the traumatic theory. Many diseases as such are being brought into direct connection with DC. They are mainly: rheumatism, lung tuberculosis, silicosis, liver cirrhosis, epilepsy, diabetes, atherosclerosis etc. Another theory claims that it is the nervous system — mainly vegetative nerves — which are responsible for DC formation Other authors consider heredity — possibly constitutional disposition — to be the cause of DC.

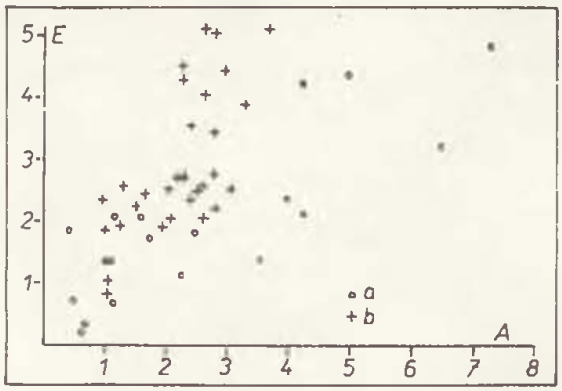


Diagram 1. Relation of Etiocholanolon (E) and Androsteron (A) in healthy persons and in patients with Dupuytren's Contracture. — ○ Healthy persons, + Patients

Within the frame of complex research of the ethiopathogenesis of DC we found in previous studies a.o. that:

1. In normal population DC is approximately 2× more frequent in men, than in women. Analysis in operated patients disclosed a relation of men to women up to 11 : 1.

Table 1. Relation of values of etiocholanolon and androsteron in control group of 21 healthy men and 33 men with Dupuytren's Contracture

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Healthy | 6x (28 %) | predominance | E | most<br>at least | 0,88<br>0,20 | average | 0,47 |
| | 13x (62 %) | predominance | A | most<br>at least | 3,80<br>0,35 | average | 1,74 |
| | 3x (10 %) | equal values | E : A | | | | |
| Patients | 20x (60 %) | predominance | E | most<br>at least | 2,70<br>0,44 | average | 1,10 |
| | 5x (15 %) | predominance | A | most<br>at least | 1,20<br>0,21 | average | 0,60 |
| | 8x (25 %) | equal values | E : A | | | | |

2. DC is a disease in adults, the higher the age, the more affected persons. During climacterium in which the most complicated types of contractures are formed, we found in demographic studies a sudden change in incidence.

3. In patients afflicted with DC, morbidity as a whole is considerably higher than in the normal population. DC starts within a certain period of time, after another disease had formed in patient, or is in progress.

Diseases forming in connection with DC affect almost solely organs of mesynchymal origin, possibly autoimunologic ethiology. (Kipikaša: 1968a, 1969b.)

Endeavouring to reply to the question why DC is a disease which is found predominantly in men and why the change in quantity occurs just during the period of climacterium, we decided to study deeper the clarification of the part which sex and age play in DC formation. We examined 17 - k e t o s t e r o i d s (further 17-KS) in urine. 17-KS are known to be katabolic products of androgens in suprarenal gland cortex and androgens from testes (possibly also ovaries), but that they are also partly katabolic products of glucocorticoids. For this reason, determination of their total value would be of little value to us.

We therefore endeavoured to differentiate precisely, katabolites of gonadal androgens — E t i o c h o l a n o l o n (further E) and A n d r o s t e r o n (further A).

## MATERIAL AND METHOD

In 33 men with DC and in 3 women with DC we collected o n c e, the 24 hour quantity of urine and sent the samples for examination to the Biochemical Laboratory at the III. Clinic of Internal Medicine of Academic C h a r v á t in Prague.

Simultaneously we carried out control examinations in healthy persons of the same age span: 21 healthy men and 18 healthy women. Altogether

therefore, 75 cases were examined. All patients were hospitalized for 2 days before urine was collected, so as to exclude errors due to changed secretion of androgens, because of the unfavourable effect of the change of from home to hospital.

## RESULTS

Men: In patients with DC we determined statistically significant predominance of E over A in 60% of the cases. We determined predominance of A over E in 15% and equal values E : A in 25%. In healthy men we found absolutely reciprocal values: predominance of A over E in up to 62%, predominance of E over A only in 28% and equal relation E : A in 10%. The total values E+A in patients with DC in comparison to the controls, were not significantly changed.

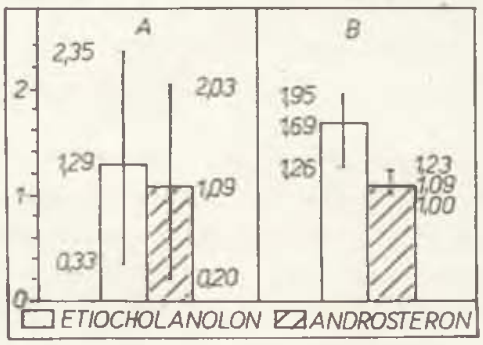


Diagram 2. Normal span of Etiocholanolon and Androsteron in 18 healthy women and values obtained in 3 patients with Dupuytren's Contracture. — A = Healthy women, B = Women patients

Women: Unfortunately only 3 women patients with DC underwent examination and for this reason we are unable to make statistical conclusions from such a small number. But we should like to mention for information that the total number E+A in women patients with DC as well as in the control was lower by half in comparison to men. Yet the level E+A was in women patients with DC higher than in the control. The predominance of E over A was also higher in patients as well as in control, thus being similar to the group of men with DC.

## DISCUSSION

The katabolic, antiflogistic and antiallergic effect of androgen antagonists — glucocorticoids and the proflogistic, anabolic and proallergic effect of androgens, are well known. The predominance of men over women in diseases of DC forces indirectly the question whether DC is bound to male sexual hormones. We actually see in our work, different finding of Etiocholanolon and Androsteron and their mutual relation in urine of patients suffering from DC in comparison to the healthy control group. Although we do not know the exact task of E and A and the mechanism of their effect, we assume that it is a disturbance of normal balance and the normal relation

between the individual components of androgens and perhaps also between androgens and glucocorticoids in favour of androgens. Probably age play an important part. Our finding of a sudden quantitative change in the incidence of DC in the period of climacterium we may explain so that the gradual climacteric involution of glands with internal secretion may occur in patients with DC unevenly, so that androgens with their proflogistic and proallergic effect become predominant. When this process occurs in genetically predisposed or by all the diseases sensibilized organism, there form favourable conditions for formation of an autoagressive disease, of which DC is one of the symptoms. Yet we must not forget the task of the central nervous system and the brain cortex, which control all glands with internal secretion and through them also liver (metabolism), muscles, kidney and mesenchyme. Yet

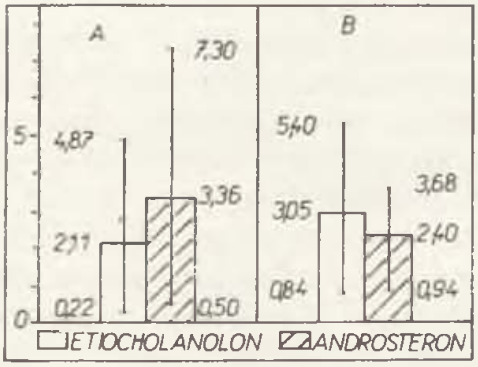


Diagram 3. Normal span of Etiocholanolon and Androsteron in 21 healthy men and values obtained in 33 patients (men) with Dupuytren's Contracture. — A = Healthy men, B = Male patients

glands with internal secretion affect by back feeding the brain cortex. If disturbance of the CNS occurs at total psychosomatic regulation, a vicious circle begins to form in the formation of psychosomatic diseases which are significantly identical with most of the autoimmunologic diseases. (These were just the diseases which we found in increased incidence in patients with DC). But this question is already outside the frame of our report and we shall try to solve it elsewhere.

## CONCLUSION

On basis of chromatographic analysis of male samples obtained from patients suffering of DC and from a healthy control group, we determined certain qualitative changes in values and mutual relations of gonadal androgens and their metabolic products contained in urine — Etiocholanolon and Androsteron in patients suffering of DC.

We assume that these changed conditions are responsible — in participation of other factors, for the formation and development of DC as one of the symptoms of autoimmunologic mesenchyme disease. Thus we explain why predominantly more men than women suffer of DC and why DC in its predominating majority starts in the preclimacteric or climacteric period.

SUMMARY

The authors state in their report, that in spite of continuous research since the times of Dupuytren, the reasons for DC occurence have not been detected. They also mention some of their own findings in complex research of DC ethiology (predominance in men, increased incidence in climacteric period), which caused more thorough studies of the role of sex and age in DC formation.

By studying the level of the metabolic products of gonadal androgens Etiocholanolon and Androsteron in urine by means of a chromatographic method according to Stark in patients with DC and in the healthy control group, they determined certain changes in values and their mutual relations. On basis of these changes, which are surveyed on tables, the authors assume, that it is a disturbance of balance and the mutual relation between the individual components in androgens and perhaps between androgens and glucocorticoids, especially significant in the period of climacterium. Predominance take up androgens with their proflogistic and proallergic effect, thus creating suitable conditions for the formation of autoagressive diseases amongst which they also rate DC. Disturbed CNS function at psychosomatic regulation of organism also plays an important part here.

On basis of these findings the authors assume that hormonal uneveness and changes in the relation of Etiocholanol to Androsteron are responsible for the significantly higher DC incidence in men that in women, as well as for the concentration of DC formation in preclimacteric and climacteric period of life.

RÉSUMÉ

**Le rôle de l'age et du sexe dans le développement de la maladie de Dupuytren**

A. Kipikaša, I. Gregorová

Les auteurs soulignent le fait que, depuis la période de vie de Dupuytren la cause respective de la maladie de Dupuytren n'a pas été découverte malgré des recherches ininterrompues. Il cite de même quelques-unes des données des recherches complexes de la maladie de Dupuytren quand à son étiologie (la plupart des hommes, les femmes surtout dans la période du climax), ayant donné l'impuls aux études plus complexes du rôle du sexe et de l'âge dans le développement de la maladie de Dupuytren.

Au cours des études du niveau des produits métaboliques des androgènes des gonades ETIOCHOLANOLOME et ANDROSTERONE dans l'urine à l'aide de la méthode chromatographique de STARK chez les malades atteint de la maladie de Dupuytren et chez la grouppe des personnes en bonne santé les auteurs ont constaté certaine différence dans les données de même que dans leur relation respective. A la base de ces différences que les auteurs présentent en forme des graphes, les auteurs forment hypothèse de l'endommagement de la balance et de la relation des components des androgènes et, peut-être même entre les androgènes et les glucocorticoides, dont la forme la plus éfficace est celle dans la période de climax.

Les androgènes deviennent plus nombreux et leur effect proflogistique de même que proallergique présente des conditions favorables pour le développement d'une maladie auto-agressive, à laquelle la maladie de Dupuytren doit être alliée à l'avis

de l'auteur. Un rôle pas moins important joue la fonction endommagée du SNC au cours de la régulation psychosomatique.

A la base de ces données les auteurs sont d'avis que la disharmonie des hormones et les changements de la relation ETIOCHOLANOLOM/ANDROSTERON sont des causes du développement augmenté de la maladie de Dupuytren chez les hommes de même que, chez les femmes, dans la période de climax et praeclimax.


ZUSAMMENFASSUNG

**Die Rolle des Geschlechts und Alters bei der Entstehung der Dupuytrenschen Kontraktur**

A. Kipikaša, I. Gregorová

Die Autoren führen an, dass die Ursache der Dupuytrenschen Kontraktur trotz der ununterbrochenen Forschungen bisher noch unbekannt bleibt. Ferner werden einige eigene Erfahrungen aus den komplexen Untersuchungen über die Ätiologie der Dupuytrenschen Kontraktur (Übergewicht an Männern, erhöhtes Vorkommen im Klimakterium) angeführt, welche Anregung zum tieferen Studium der Rolle des Geschlechtes und Alters bei dem Entstehen der Dupuytrenschen Kontraktur gegeben haben.

Durch Untersuchungen des Spiegels der Stoffwechselprodukte der Gonadenandrogene Etiocholanolon und Androsteron im Harn mittels der chromatographischen Methode nach Stark bei Kranken mit Dupuytrenscher Kontraktur und bei einer Kontrollgruppe sind gewisse Veränderungen in den Werten und in ihren gegenseitigen Verhältnissen festgestellt worden. Auf Grund dieser Veränderungen, die hier in Tabellen übersichtlich angeführt sind, setzten die Autoren voraus, dass es sich um eine, besonders im Klimakterium ausgeprägte Störung des Gleichgewichtes und des gegenseitigen Verhältnisses zwischen den Einzelkomponenten der Androgene und möglicherweise auch zwischen den Androgenen und Glukokortikoiden handelt. Das Übergewicht wird von den Androgenen mit ihren prophlogistischen und proallergischen Wirkungen gewonnen, womit geeignete Bedingungen für das Entstehen von autoagressiven Erkrankungen gebildet werden, zu welchen auch die Dupuytrensche Kontraktur zu zählen ist.

Die gestörte Funktion des zentralen Nervensystems bei der psychosomatischen Regulation des Organismus spielt dabei auch eine bedeutende Rolle.

An Hand dieser Befunde gelangt der Autor zur Schlussfolgerung, dass das hormonale Ungleichgewicht und das Misverhältnis zwischen Etiocholanolon und Androsteron sowohl für das wesentlich höhere Vorkommen der Dupuytrenschen Kontraktur bei Männern als auch für die Entwicklungskonzentration der Dupuytrenschen Kontraktur im klimakterischen und präklimakterischen Stadium verantwortlich sind.



RESUMEN

**Tarea del sexo y la de la edad en el origen de la contractura de Dupuytren**

A. Kipikaša, I. Gregorová

Los autores mencionan en su obra que la causa la contractura de Dupuytren no es conocida a pesar de la investigación incesante desde hace el tiempo de Dupuytren. Seguidamente indica algunos conocimientos propios de la investigación general de la etiología de la contractura de Dupuytren (la superioridad de los hombres, la frecuencia aumentada en la edad climatérica), los que dieron impulso al estudio más profundo de la tarea del sexo y de la edad en el origen de la contractura de Dupuytren.

Por el examen del nivel de los productos de metabolismo de los andrógenos gonadiales ETIOCOLANOLÓN y ANDROSTERÓN en la orina por medio del método cromatográfico según STARK en los pacientes con la contractura de Dupuytren y en un grupo sano de control comprobaron ciertos cambios de los valores y sus relaciones recíprocas. Sobre la base de estos cambios los que se indican sinópticamente en las tablas los autores suponen que se trata del desajuste del equilibrio y de la correlación entre los componentes particulares de los andrógenos y tal vez entre los andrógenos y glucocorticoides, el que es particularmente expresivo en la edad climatérica.

La superioridad consigen los andrógenos con su efecto proflogístico y proalérgico, por lo cual forman las condiciones convenientes para el principio de la enfermedad autoagresiva a las que cuenta también la contractura de Dupuytren.

La función alterada de CNS en la regulación psicosomática del organismo juega en esto también un papel importante.

Sobre la base de estas comprobaciones los autores raciocinan, que la disarmonía de hormones y los cambios en la correlación del Etiocolanolón al Androsterón son responsables de la presencia de la contractura de Dupuytren considerablemente más alta en los hombres que en las mujeres así como de la concentración del origen de la contractura de Dupuytren en la edad preclimatérica y climatérica.

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To prof. V. Vršanský M.D. at the occasion of his 55th birthday
Department of Plastic Surgery,
Komenský University Bratislava (Czechoslovakia)
Director prof. Š. Démjen M.D.
Medical Faculty, Department of General Biology
Director prof. V. Vršanský M.D.

# CONTRIBUTION TO THE RESEARCH OF MALFORMATIONS ON THE HANDS

L. ŠIMUN, I. TOMO

## INTRODUCTION

It was the purpose of our research to determine the frequency of incidence of developmental disorders in the upper extremities in the population of Slovakia. We concentrated upon determination of the type of heredity and upon the effect of teratogenic factors, which might affect formation of the mentioned disorders. The type of heredity we formed by means of genealogic method.

Already in the past, several authors paid attention to the research of inborn and hereditary defects in extremities in man. Especially from the surgical aspects these problems have only been elaborated descriptively. For example questions connected with the clarification of the type of heredity in polydactylia and syndactylia were being solved by Harlin (1921), Schultz (1922), Scott (1933). Besides these reports there have been gradually described also other disorders in extremities, namely in the hand, as hypodactylia by Dubreuil (1932), brachydactylia by Pires (1922). Koenner (1939) elaborated and described heavier disorders in hands and feet.

A new contribution to the solution of a group of questinos in respect of these problems, are the reports concerned with disorders from the point of innervation at various anomalies in the hand. These reports dealt mainly with the relation of the change of innervation to the papillary relief in the palm

Table 1
Distribution according to age

| Age group | 1–5 | 5–10 | 10–15 | 15–20 | 20–25 | 25–30 | 30–35 | 35–40 | 40–45 | 45–50 | 50–55 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number | 50 | 15 | 7 | 2 | 2 | 5 | 4 | 2 | 0 | 0 | 1 |

and fingers. In this respect pioneer work was carried out by Bonnevie (1922), Cumminsa and Sicoma (1923), who compiled changes of dermatoglyphics in hands affected by syndactylia and polydactylia. Of our authors it was Valšík (1932) and Bartoš (1940). Bartoš described changes of dermatoglyphics in hand stumps. To-day along with this method there is mainly carried out cytogenetic research of individuals affected by inborn or hereditary defects in extremities. Of more recent reports there ought to be mentioned Oksah (1964), Berger (1965), Shonerberger (1966), Inberg (1969), France (1969), Kaji (1969) a.o.

Table 2
Distribution of patients according to the individual disorders

| Total number of examined persons | Syndactylia | Polydactylia | Syndactylia and Polydactylia | Complicated Malformations |
|---|---|---|---|---|
| 88 | 51 | 20 | 9 | 8 |

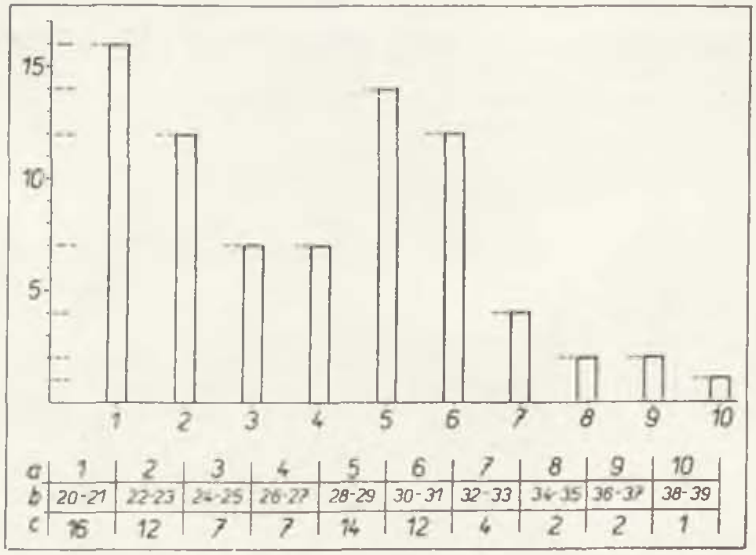
## MATERIAL AND METHODS

For the research we used material recorded at the Clinic of Plastic Surgery Medical Faculty in Bratislava, and at the Pediatric Clinic Faculty Hospital — Department of Surgery in Bratislava. The probands were called according to records at the mentioned clinics in the years 1967—1969. They came from various parts of Slovakia. Our material comprises patients from one to 54 years of age. We divided the patients according to age, sex (tab. 1) and character of the disorder (tab. 2) into several groups. When gaining information on probands and their families we applied the genealogic method, on basis of which we compiled the genealogy. Thus we were able to determine according to the course of the individual diseases in descendants of several generations, which type of heredity it is when mentioned hereditary and inborn defects of hands exist. From the point of geographical placement of the individual disorders we were interested in the question in which region of Slovakia malformations of extremities are most frequent and to what extent it is possible to consider the influence of consanguinity, possibly marriages within the same communities or endogamic regions. We followed up correlation between the age of mothers and predisposition in the earliest period of conception to give birth to children with malformations. We recorded the age of mothers in the time of birth of the proband as well as the number of brothers and sisters and their health status. In the personal case history of the mother we determined the possible effects of teratogenic substances upon foetus mainly in the first trimester.

## RESULTS

From our preliminary — so far not terminated — research, it may be estimated that the greatest incidence of inborn defects in the upper extremities were recorded by us in Southern Slovakia (25 cases), this representing 42%.

The imaginary line proceeds from Bratislava in direction of Komárno. A second, considerably smaller region are the surroundings of Trnava. A genealogical analysis of investigated families disclosed that in 30% of the group there are several persons in the family affected. The course of heredity in syndactylia and polydactylia has been known for quite some time. It is an autosome dominating type and this conclusion is also confirmed by our results. There is a relatively high percentage of probands (70%) from mar-




| a | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| b | 20-21 | 22-23 | 24-25 | 26-27 | 28-29 | 30-31 | 32-33 | 34-35 | 36-37 | 38-39 |
| c | 16 | 12 | 7 | 7 | 14 | 12 | 4 | 2 | 2 | 1 |

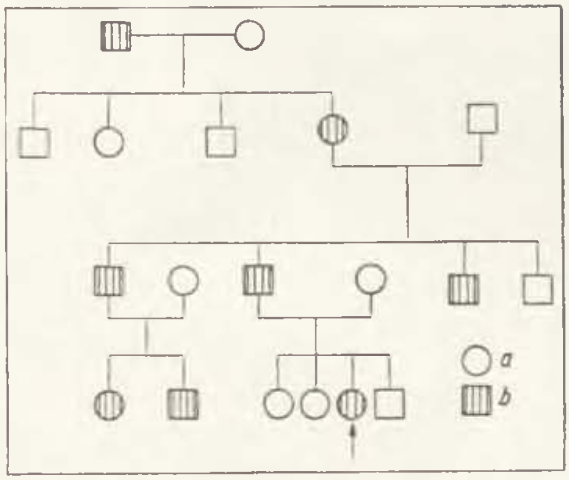
Tab. 3. The table demonstrates the relation of the age of the mother to the number of children born with anomalies
a — groups, b — age, c — number

riages where the parents are from the same circles of relatives possibly from the same communities. In accordance with other authors we determined that with the proceeding age (around 30 years) the predisposition for giving birth to children with inborn defects is greater (tab. 3). In the time of parturition 45% of the mothers were above the age of 28 years. Altogether we determined the age of mothers in 77 cases. In 54% the first child was afflicted with malformation. These results are distorted by the fact that some couples do not attempt to have further children if the first child is born with a certain hereditary or inborn defect. Thus of our group 35% of the married couples only have one child. In 10% we determined a combination of other diseases with disorders in the upper extremity. The disorders were: hypospadias, meningitis, epileptic fits. Evident mental retardation we followed up in two cases.

Weight and length of the infant was at birth within standard. The relation of sex in the investigated group was complex in all studied disorders 2 : 1 in favour of male. In 17 cases the course of pregnancy was disturbed by different influences which might have affected development of foetus unfavorably.

## DISCUSSION

There still remains an open question, what the causes of the incidence of inborn defects are. In our group we endeavoured to find out which factors affect development of foetus in the period of intra-uterine life. Approximately 10% of the mothers stated use of substances which could have influenced correct development of foetus. The hazards of inborn malformations due to the infection of the mother which had gone through rubeola during the first trimester of gravidity, are according to Swam 100%. In the last decade also influenza is considered to be a teratogenic factor, the group of described




Tab. 4. The genealogy demonstrates the autosome dominating type of heredity of syndactylia
a — healthy, b — synd. and polyd. on hands and feet

defects after influenza was very diverse. Not even during the large influenza epidemic in the years 1957—58 was there with us an increased incidence of inborn disorders observed. The influence of antibiotics upon anomalies has not been sufficiently investigated, malformations of extremities were experimentally induced by streptomycine and penicilline.

Mellin followed up incidence of malformations in women which had used Thalidomid/Contergan as sedative in pregnancy. The author determined that in 1960 their fell to 1000 alive born children 0,3—0,7% to children with inborn or hereditary defects, in 1961 their number increased to 3,07, in 1962 to 2,5%. It is known that the afflicted children suffered of complicated malformations of extremities, mainly amelias and phocomelias. The teratogenic effect of Thalidomid was not confirmed in experiments in rats. Kučera reports the unfavourable effect of poisons of which lead is the most dangerous. We shall come back to this question when we shall have examined a greater number of probands.

In agreement with the foreign authors Mohan (1969) and Barsky (1958) we found that in the mentioned disorders it is the autosome dominating type of heredity. This type is demonstrated on tab. 4.

So far no systematic investigation on the frequency of inborn defects in Slovakia during the past five years, has been carried out. We endeavoured to find out the frequency of inborn defects of the upper extremities in the years 1966—68. According to our results in 1966 it was 1 : 1.700, in 1967 1 : 3.000, in 1968 1 : 3.400. These results are distored by the fact that not all parents report for examination with a certain defect immediately after birth of the child. Sršeň reports in the years 1958—62 incidence of polydactylia in the material of the Maternal Clinic in Košice 1 : 800, syndactylia 1 : 3198.

## CONCLUSION

We examined 88 cases of children with malformations in the upper extremities. We carried out genealogic analysis, determined the possible effects of teratogenic substances upon mother and foetus and also the main regions of incidence of inborn defects. Our results stand in agreement with the conclusions of our and foreign authors. This part of our research is supposed to aid clarification of partial questions from the complex of research of inborn and hereditary defects in Slovakia.


## RÉSUMÉ

### Attribution à la recherche des malformations des mains

L. Šimun, J. Tomo

Dans la clinique de la chirurgie plastique et dans la faculté de la biologie, département de la génétique humaine, les auteurs ont entrepris les recherches des défauts innés et héréditaires dans la région de Slovaquie. Ils ont soumis à l'épreuve les malades souffrant des malformations des membres supérieurs. Les données de ces recherches sont d'accord avec celles des autres auteurs notre pays et de l'étranger. Comme suite les auteurs entreprendront les recherches touchant le champ endogamique avec le but de préciser les données sur un nombre plus remarquable des personnes respectives.

## ZUSAMMENFASSUNG

### Ein Beitrag zu den Untersuchungen über die Malformationen auf den Händen

L. Šimun, J. Tomo

Auf der Klinik für plastische Chirurgie und auf dem Lehrstuhl für allgemeine Biologie, Zweig Genetik des Menschen, wurden Untersuchungen über die angeborenen und erblichen Fehler in der Slowakei vorgenommen. Es wurden Kranke mit Anomalien an den oberen Gliedmassen untersucht. Die Ergebnisse unserer Untersuchungen stehen mit den Schlüssen unserer und fremder Autoren in Übereinstimmung. Im nächsten Teil unserer Untersuchungen werden wir uns auf die Verbreitung unserer Beobachtungen auf den endogamischen Gebieten orientieren, mit dem Ziel unsere Ergebnisse an einer grösseren Population zu präzisieren.

RESUMEN

**Colaboración a la investigación de las deformaciones de las manos**

L. Šimun, J. Tomo

En la Clínica de Anaplastia y en la Cátedra de la Biología General en el departamento de la genética humana realizamos la investigación de las deformaciones congénitas y hereditarias en la Eslovaquia. Examinamos a los pacientes con anomalías en las extremidades superiores. Los resultados de nuestra investigación coinciden con las conclusiones de nuestros autores lo mismo que con las de los autores extranjeros. En la parte siguiente de la investigación nos concentrarémos en la amplificación de nuestras observaciones en las esferas endogamicas con el esfuerzo de precisar nuestros resultados en un conjunto más grande.

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# RESULTS OF TUBED PEDICLE FLAP PLASTY IN LARGE AND COMPLICATED EYELID DEFECTS

M. V. ZAIKOVA, G. S. ZUS

Large and complicated defects in eyelids resulting from serious injury or excision of malignant tumours are frequently combined with large defects in the orbital walls and periorbital region. In the literature, there are but rare reports about the plastic treatment of such defects with a tubed pedicle flap and their authors usually point to the great difficulties encountered in these operations (Filatov, 1948; Tomashevskaia 1947; Kurlov, 1948; Kolen, 1959).

Originally, the method of employing a tubed pedicle flap was suggested by the distinguished Soviet ophthalmologist, V. P. Filatov in 1917, and it received widespread recognition, particularly in plastic operations for large defects in the face (Gillies, 1920; Khitrov, 1954; Kozakiewicz and Mielnik, 1957; Zoltán, 1958, etc.).

We have now verified the late results of plastic operations for large and complicated eyelid defects repaired with tubed flaps in 46 patients, five to 22 years after completion of the surgical treatment.

The main indications for the employment of a tubed flap were large and complicated defects in the eyelids, orbit and periorbital region, resulting from

Fig. 1. Patient G. prior to operation. Large and complicated naso-orbital defect on left side resulting from accident

serious injuries or excision of malignant tumours of the eyelids and lacrimal sac.

With regard to the diagnosis, the operated on patients may be divided into the following groups: bilateral scar ectropion with gross cicatrization of the periorbital region in five patients, unilateral scar ectropion with disfiguring scars of the face in four patients, large defect in eyelids penetrating

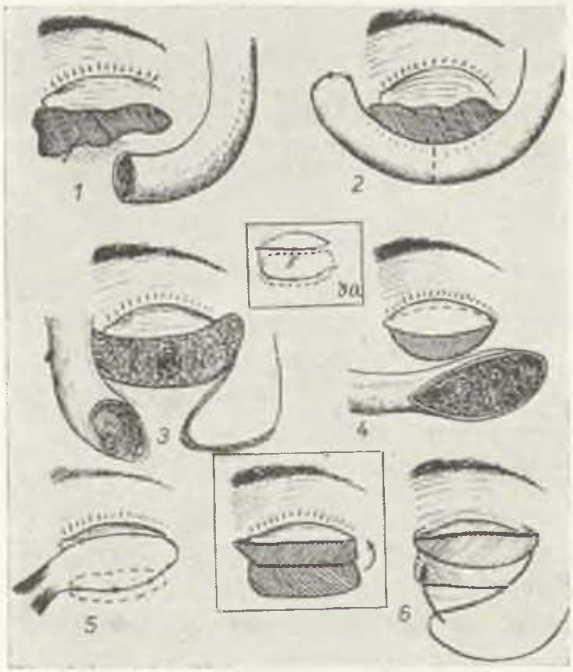


Fig. 2. Diagram of tubed flap plasty carried out for large nasoorbital defect. — Fig. 3. Same patient as in fig. 2 after operation

into the nasal cavity and combined with a defect in the dorsum nasi in five patients, penetrating defect in eyelids together with a defect in one or more orbital walls in 28 patients, malignant tumour of eyelids in three patients and lacrimal sac cancer in one patient. The patients were operated on at an age between eight and 55 years and the following operations were carried out: 1. preparatory operations (formation of tubed pedicle flap according to Kyandsky and transposition of it to site of defect), 2. main operations (reconstruction of eyelids and periorbital region), 3. corrective operations (improving upon results of tubed flap plasty).

The most suitable site for the formation of a tubed flap was found to be the anterior aspect of the thorax in men and the medial aspect of the arm in women.

Using a primary tubed flap shortened the total time required for the plastic treatment because the defect could be covered at the stage when the first pedicle was transposed to it. If transposition had to be carried out by migration of the flap, it was sutured as near to the eyelid defect as possible without producing kinking or tension in it.

At stages when the arm or head had to be immobilized, a plaster cast was aplied. Each patient was operated on according to a strictly individual plan of treatment taking into account the features of the defect in the eyelids and periorbital region. On an average, six to seven operations were required for completing the plasty. In some cases, however, the number of corrective operations reached up to 20 and even more. Other plastic methods, such as local tissue plasty, free grafting of skin or mucosa, homo- and heterocartilage transplantation, etc., were used for improving upon the cosmetic results.

Good late results were ascertained in 42 patients and satisfactory in four. Poor results after tube flap plasty were not observed. The satisfactory results mostly depended on the shift of the reconstructed eyelids towards the side of the unrepaired defects in the orbit.

For a plasty of large and complicated naso-orbital defects, two to three tubed flaps were usually required.

The extract of the case history No 4350 is given below:

Patient G., a man aged 20, was admitted to the Institute with a defect comprising the loss of the lower eyelid and the medial, lower and lateral walls of the orbit on the left side and penetrating into the nasal cavity. The nose and maxilla, too, showed partial defects. The condition was the result of a shell splinter injury in 1941 (fig. 1).

First stage of plasty: formation of first tubed pedicle flap on anterolateral aspect of thorax measuring 20 × 8 cm.

Second stage: transposition of lower pedicle to temporal region (fig. 2—1).

Third stage: transposition of upper pedicle to region of dorsum nasi defect (fig. 2—2).

Fourth stage: reconstruction of left cheek and orbit with tubed flap. — The flap was divided into two halves, the medial half was left pendent and the lateral used for the reconstruction of the lower eyelid and cheek (fig. 2—3 and 3a).

Fig. 4. Same patient as in fig. 2 15 years after completion of surgical treatment. — Fig. 5. Patient P prior to operation. Large and penetrating defect of eyelids and orbital walls on left side resulting from accident

Fifth stage: reconstruction of nose with medial half of tubed flap. — This operation was carried out by M. V. Mukhin.

Afterwards, several local plasties were performed, but reconstruction of the lower eyelid was not successful. Therefore, a second tubed pedicle flap had to be formed on the medial aspect of the right arm and a third one on the left side of the neck. The lower pedicle of the neck flap was then sutured

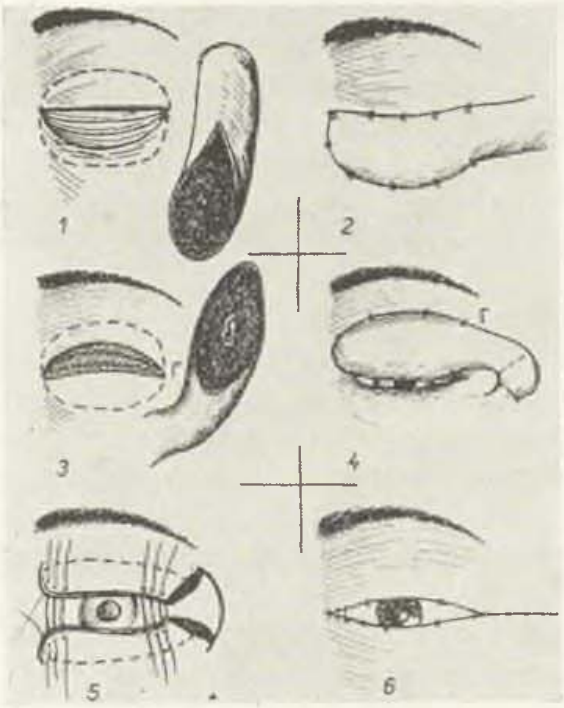


Fig. 6. Diagram of complete reconstruction of both eyelids with tube pedicle flap. — Fig. 7. Same patient as in fig. 6 after operation

to the edge of the eyelid defect and the defect of the inferior orbital wall filled with a graft of homologous cartilage fixed in alcohol (fig. 2—4 and 5). The lower eyelid was reconstructed using a local skin flap (fig. 2—6). With these three tubed flaps and the implantation of homo- and heterologous cartilage grafts, the large naso-orbital defect was completely repaired (fig. 3). Fig. 4 shows the condition 15 years after completion of surgical treatment.

Large and penetrating defects of both eyelids and the walls of the orbit were usually repaired with one tubed pedicle flap formed on the thorax.

To give an example, the extract of case history No 10361 is referred to below:

Patient P, a man aged 32, was admitted to the Institute with complete loss of the eyelids, the eye ball and the orbital walls on the left side resulting from a shell splinter injury in 1944 (fig. 5).

First stage of reconstruction: formation of tubed pedicle flap on left aspect of thorax measuring 16 × 8 cm.

Second stage: transposition of lower pedicle to temporal region (fig. 6—1).

Third stage: reconstruction of lower eyelid with upper pedicle of tubed flap (fig. 6—2).

Fourth stage: reconstruction of upper eyelid and implantation of cartilage graft (fig. 6—3 and 4).

Fifth stage: canthoplasty and additional implantation of cartilage (fig. 6—5 and 6).

Afterwards, a number of corrective operations, including further implantation of cartilage, were performed. Fig. 7 shows the condition 17 years after completion of surgical treatment.

Tubed flap plasty was also employed in defects of eyelids and orbital walls resulting from excision of malignant tumours.

Fig. 8. Patient B. Complete loss of eyelids and penetrating defect in medial orbital wall resulting from excision of malignant tumour in orbit

As an example, the extract of case history No 39350 is given below:

Patient B., a woman aged 27, was admitted to the Institute with loss of both eyelids and penetrating defect in the medial wall of the orbit on the right side resulting from the excision of a malignant tumour eleven years previously (fig. 8).

First stage: formation of tubed pedicle flap on medial aspect of right arm measuring 18 × 7 cm.

Second stage: repair of penetrating defect in medial wall of orbit with tubed flap, forming of two pedicle flaps from scar tissue at bottom of defect and, after swinging them into defect, suturing one to the other. Unfolded pedicle of tubed flap sutured to edge of defect (fig. 9—1 to 3).

Third stage: second pedicle of tubed flap separated from arm, spread out and sutured to edges of incision made over inserted eye prosthesis around the healed-in first pedicle (fig. 9—4).

Fourth stage: formation of palpebral fissure. — Incision made in healed-in pedicle corresponding to level of palpebral fissure of left eye and surplus fatty tissue excised.

As the result of surgical treatment, the eyelids were reconstructed and conditions created for the insertion of an eye prosthesis (fig. 10).

Large defects of eyelids and the medial wall of the orbit are met with not only as a result of injury, but also after excision of malignant tumours of the eyelids and lacrimal sac. For reconstruction of the lost structures, a large amount of mobile plastic material is usually required.

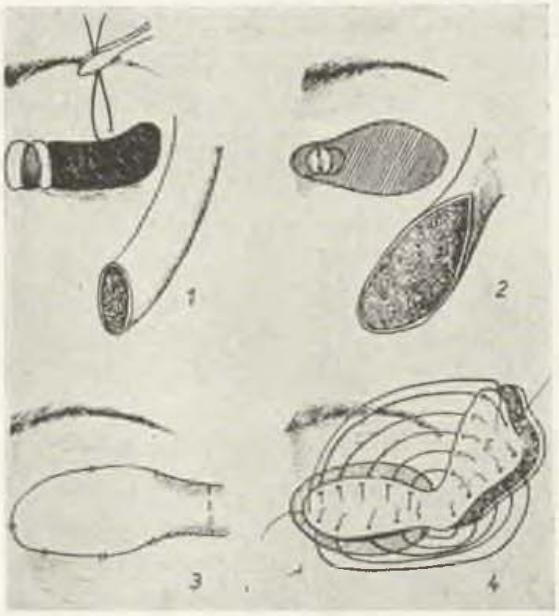


Fig. 9. Diagram of deep plastic repair of eyelids and defect of medial orbital wall with tubed pedicle flap. — Fig. 10. Same patient as in fig. 9 seven years after completion of surgical treatment

As an example of a good result of tubed flap plasty in such conditions, the extract of case history No 30063 is given below:

Patient B, a man aged 36, was admitted to the Institute with a recurrent malignant tumor of the left lacrimal sac.

In the region of the lacrimal sac, a large tumour had developed which shifted the eye ball up- and outwards. The skin covering the tumour was ulcerated (fig. 11).

First stage of surgical treatment: formation of tubed pedicle flap on left side of thorax measuring 24 × 8 cm.

Second stage: removal of tumour and primary deep reconstruction of eyelids and medial wall of orbit with tubed flap. The tumour was excised radically by an incision made through healthy tissue of the eyelids and by curettage of the defect in the orbital wall, including the ethmoid cells which the tumour had invaded. The profuse bleeding from the ethmoid cells was controlled by packing the wound with the unfolded pedicle of the flap separated from the thorax. Then an islet of skin was excised from one side of the

pedicle and sutured to the tissue around the orbital defect. The remaining part of the flap was sutured to the edged of the skin defect. The surface facing the eye ball was covered with a free mucosa graft excised from the mucous lining of the lower lip measuring 2 × 2 cm (fig. 12—1 and 2). Histological examination of the excised tissue confirmed the diagnosis of lacrimal sac cancer.

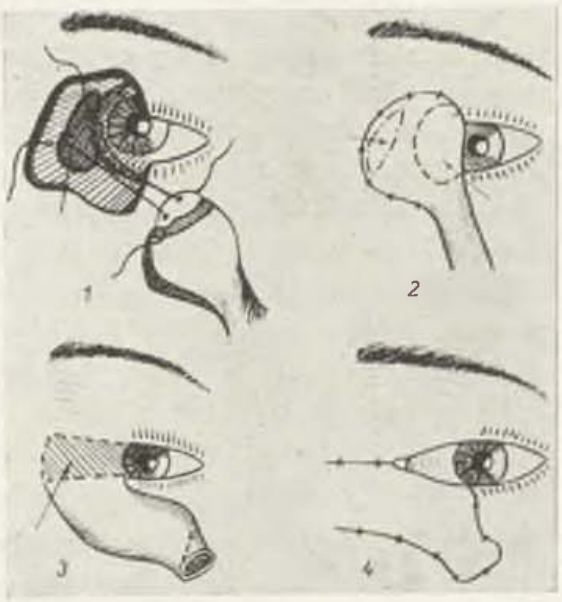


Fig. 11. Patient B. Malignant tumour of left lacrimal sac. — Fig. 12. Diagram of repair of eyelids and defect in medial orbital wall after excision of tumour

Fig. 13. Same patient as in fig. 11 eleven years after completion of surgical treatment

Third stage: reconstruction of the lower eyelid with tubed pedicle flap after resection of surplus tissue (fig. 12—3 and 4). Fig. 13 shows the condition 11 years after completion of surgical treatment.

In this case, employment of a tubed pedicle flap permitted wide excision of the tumour and repair of a complex defect of the eyelids and medial wall of the orbit in one stage.

Tubed flap plasty was also carried out successfully in children. In complicated defects of eyelids, the reliability of a tubed flap plasty and the confidence in its satisfactory result well justified the expenses connected with the many staged and time-consuming operations.


SUMMARY

In 46 patients, the results of plasties carried out for large and complicated defects of eyelids using a Filatov tubed pedicle flap were checked up to 22 years after completion of the surgical treatment. The results ascertained were good in all cases. Only in four patients had the reconstructed eyelids been shifted towards the large and unrepaired bone defect in the orbit. Employment of a tubed pedicle flap permitted reconstruction in defects of eyelids, orbit and periorbital region largely differing in size and localization. Tubed flap plasty is unsurpassed as to its results achieved in large and complicated defects of eyelids originating from both accidental injury and excision of malignant tumours of eyelids and lacrimal sac. Homo- and heterologous cartilage grafts may be used to improve upon support and contour of the transplanted tubed flap tissue.



RÉSUMÉ

**Les résultats de la plastie des grands défauts combinés des paupières à l'aide du lambeau tubulé de Filatov**

M. V. Zaikova, G. S. Zus

Chez 46 des malades les auteurs ont contrôlé les résultats de la plastie des grands défauts combinés des paupières à l'aide du lambeau tubulé de Filatov dans la période de 22 ans après l'intervention. Dans tous les cas un résultat favorable a été obtenu. Seulement chez quatre des malades les paupières glissèrent respectives dans le défaut pas bien rempli de l'orbite.

Le lambeau tubulé nous permet de couvrir les défauts des paupières, de l'orbite elle-même et de la partie périorbitale, défauts divers quand à la grandeur et la localisation. La plastie à l'aide du lambeau tubulé reste jusqu'alors unique quand aux résultats dans des cas des grands défauts combinés des paupières et de la vessie lacrimale en suite des grands traumatismes ou des tumeurs malignes.

L'emploi des homo et heterogreffes cartilagineux servant de réconstruction des soutiens et des coutures fait amméliorer les résultats de la plastie à l'aide du lambeau tubulé.



ZUSAMMENFASSUNG

**Ergebnisse der Plastik umfangreicher kombinierter Augenliddefekte nach Deckung mit dem Rundstiellappen nach Filatow**

M. V. Zaikova, G. S. Zus

Bei 46 Kranken wurden die Ergebnisse der Plastik umfangreicher kombinierter Augenliddefekte nach Deckung mit dem Rundstiellappen nach Filatow in einer Zeitspanne von bis zu 22 Jahren nach der Operation verfolgt. In allen Fällen ist ein positives Ergebnis erzielt worden. Lediglich bei vier Kranken haben sich die wiederhergestellten Augenlider seitlich in den unausgefüllten Defekt im Skellett der Augenhöhle

verschoben. Der Rundstiellappen gestattet die Deckung der Defekte der Augenlider, der Augenhöhle und der periorbitalen Gegend, welche sowohl in ihrem Umfang als auch in ihrer Lokalisation sehr unterschiedlich waren. Die Plastik mit dem Rundstiellappen gibt Ergebnisse, welche in den Fällen umfangreicher kombinierter Augenlid- und Tränenbeuteldefekte nach Unfällen oder Exstirpationen bösartiger Tumoren bisher noch nicht übertroffen wurden. Die Anwendung von Homo- und Heterotransplantaten des Knorpels zur Wiederherstellung von Stützen und Konturen verbessert die Ergebnisse der Plastik mit dem Rundstiellappen.


RESUMEN

**Resultados de la plástica de grandes defectos combinados de los párpados cubiertos por el lóbulo tubular según Filatov**

M. V. Zaykova, G. S. Zus

En 46 enfermos se siguieron los resultados de la plástica de los defectos combinados grandes de los párpados cubiertos por el lóbulo tubular según Filatov a saber hasta 22 años después de la operación. En todos casos se consiguieron los resultados positivos. Solamente en cuatro enfermos los párpados reconstridos movieron a la parte del defecto no llenado en el esqueleto de la órbita. El lóbulo tubular permitió cubrir lo defectos de los párpados, los de la órbita y los de la zona periorbital, los que habían sido muy diferentes tanto en lo que se refiere a la dimensión como en lo que se refiere a la localización. La plástica con el lóbulo tubular no es alcanzada hasta nuestros días en los resultados en los casos de grandes defectos combinados de los párpados y del saco lacrimal aparecidos después de los accidentes o después de la extirpación de los homo- y heterotrasplantes del cartílago para la reconstrucción de los sostenes y de las conturas mejora los resultados de la plástica con el lóbulo tubular.


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# TRANSPLANTATION OF HOMOLOGOUS CARTILAGE STERILIZED IN FORMALIN VAPOURS

## (Preliminary Report)

K. D. TIMASHKEVICH, G. V. KRUCHINSKY

In recent years, the possibilities of procuring tissues for implantation without keeping to the rules of asepsis, were widely studied. Taking various tissues in the mortuary and sterilizing them subsequently, greatly shortens the time of operation, does not require special premisses, personel and sterile towels or instruments, etc.

At present, methods of sterilization, such as irradiation with gamma-rays (De Vries et al., Jones et Basset, Sautin), treatment with beta-propiolactone (Logrippo et al., Savelev, Kuzmenko), ethylene oxide (Snyder et al., Yemeshina and others), etc., have been developed to an adequate degree and are being practised. However, most of the methods of tissue sterilization used to-day require special equipment or material which is difficult to obtain, thus they encounter great obstacles to their being employed on a wider scale.

The aim of this study was to find a method of sterilization of tissues for homotransplantation which could be used under any conditions.

As is well known, formaldehyde possesses considerable antimicrobial qualities (Rufanov, Kandinsky and others). At the same time, tissues treated with formalin were used in experiments and clinical practice (Anukhin, Vojno-Yasensky, Moin et al., Rozvadovsky and others).

For the investigation of the antimicrobial qualities of formalin, three series of experiments were carried out in which the tissues to be used as holomogous transplants were contaminated with standard strains of microflora.[1])

[1]) The antibacter qualities of formalin vapours were studied in the Microbiological Laboratory of the Central Institute of Traumatology and Orthopaedics (chief of laboratory V. M. Melnikova).

In the first series (34 experiments), the tissue was contaminated with a microbial suspension of cultures of staphylococcus, pyocyanea, intestinal and sporogenic bacilli. The concentration of microbial bodies in the suspension was 500,000 per 1 ml. The tissue to be contaminated was immersed in the microbial suspension for five minutes.

In the second series (6 experiments), the tissue was contaminated in a suspension of a microbial association. The concentration of each species of microbial bodies was also 500,000 per 1 ml suspension. The suspension contained staphylococcus, pyocyanea and enterococcus. The specimen of tissue was immersed in the microbial suspension for 30 minutes.

In the third series (50 experiments), the tissue was contaminated with random microflora during taking without keeping to the rules of asepsis.

Pieces of contaminated tissue were then placed in a hermetically closed glass dish and exposed to formalin vapours at 20 to 23 °C for periods of 15 minutes to 24 hours. Afterwards, the pieces of tissue were transferred to a test-tube with meatpeptone broth and kept in a thermostat for ten days. Pieces of tissue not treated with formalin vapours served as controls. Smears were then made from specimens in the test-tubes in which bacterial growth had been detected, these were stained according to Gram and examined under the microscope in order to identify the microbes. The results thus obtained were entered into a table. As can be seen from this table 1, staphylococcus and intestinal bacillus (Escherichia coli ?) showed no growth after the tissue specimen had been treated with formalin vapours for 30 minutes, but slight growth of pyocyanea and sporogenic bacilli could be observed. After 60 minutes exposition to formalin vapours, no growth was detected in any of the test-tubes. The controls, at the same time, showed growth of the respective microflora.

In the second series of experiments, in which tissue specimens contaminated with a microbial association, were sterilized for 30 minutes. Five of the six test-tubes showed no growth at all; in the one, growth of a gram-positive bacillus was observed. The controls showed growth of microflora in all test-tubes.

In the third series of 50 tissue specimens taken without keeping to the rules of asepsis, always ten were exposed to formalin vapours for different periods (24 hrs., 3 hrs., 30 min., 15 min.). Microbial growth was observed in none of the specimens. In the controls, variform microflora (staphylococci, gram-positive and gram-negative bacilli) grew in all test-tubes.

From the above, it becomes evident that formalin vapours possess considerable antimicrobial qualities. With the treatment of the microflora with formalin vapours at room temperature for 30 minutes, no or only slight growth was observed in most test-tubes filled with the nutritive medium. After exposure to formalin vapours for 60 minutes, microbial growth was found in no case, neither in mass-contaminated tissue nor in tissue contaminated at random as under ordinary conditions of its procuration.

In order to study the fate of homologous cartilage grafts which had been sterilized in formalin vapours, two series of experiments were carried out.

In the first series (12 experiments), rib cartilage of dog together with its perichondrium was taken under aseptic precautions, and pieces of 3 × 1 cm dimensions were conserved by freezing at — 70 °C and stored at — 25 °C for two to three weeks. Then these specimens were implanted under the skin of the back in dogs.

In the second series, pieces of cartilage of the same dimensions and from the same animals were taken without keeping to the rules of asepsis. The material was then placed in a desiccator of 2,540 ml volume on a fine net of stainless steel. The bottom of the desiccator (with an area of 80 $cm^2$) was covered with 15 to 20 ml of 40% formaldehyde. Then the desiccator was covered with a lid and the pieces of cartilage exposed to the formalin vapours for one hour at 20 to 23 °C. On microbiological examination of these specimens, no bacterial growth was observed. They were then placed in a sterile dish and conserved as those of series I. Implantation of the homologous cartilage grafts was also carried out in the same way (28 experiments). In all instances, healing proceeded by first intention. Biopsy of the cartilage implants was carried out two weeks and one, two, three, six and seven months after implantation. The specimens were prepared by standard histological methods. The celloidine blocks were sectioned longitudinally. Sections of 10 to 12 $\mu$ thickness were stained with haematoxylin-eosin or according to van Gieson.

On histological examination, no differences between the slides of the first and second series of experiments were detected. The shape, dimensions and structure of the implants had been preserved to a considerable degree

Tab. 1. Antimicrobial Qualities of Formalin Vapours

| Species of microbe | Exposed to formalin vapours for minutes | Experiment | Controls | Number of experiments |
|---|---|---|---|---|
| Staphylococcus | 30 | no growth | growth | 4 |
| | 60 | no growth | growth | 4 |
| Pyocyanea | 30 | slight growth | growth | 5 |
| | 60 | no growth | growth | 5 |
| Intestinal bacillus | 30 | no growth | growth | 4 |
| | 60 | no growth | growth | 4 |
| Sporogenic bacillus | 30 | slight growth | growth | 5 |
| | 60 | no growth | growth | 5 |
| Microbial association | 30 | slight growth in 1 test-tube | growth | 6 |
| Random microflora | 15 min. to 24 hrs. | no growth | growth | 50 |

(see fig. 1) both in the experimental specimens and in the controls; a number of cells showed distinctly stained nuclei, although the nuclei of some cells had not been stained at all. The matrix usually appeared basophilic. In some slides, the peripheral zone showed an oxyphilous matrix. The fibrous connective tissue surrounding the implants had been preserved on large areas and, at places, invaded the cartilage to a shallow depth. In some parts, this

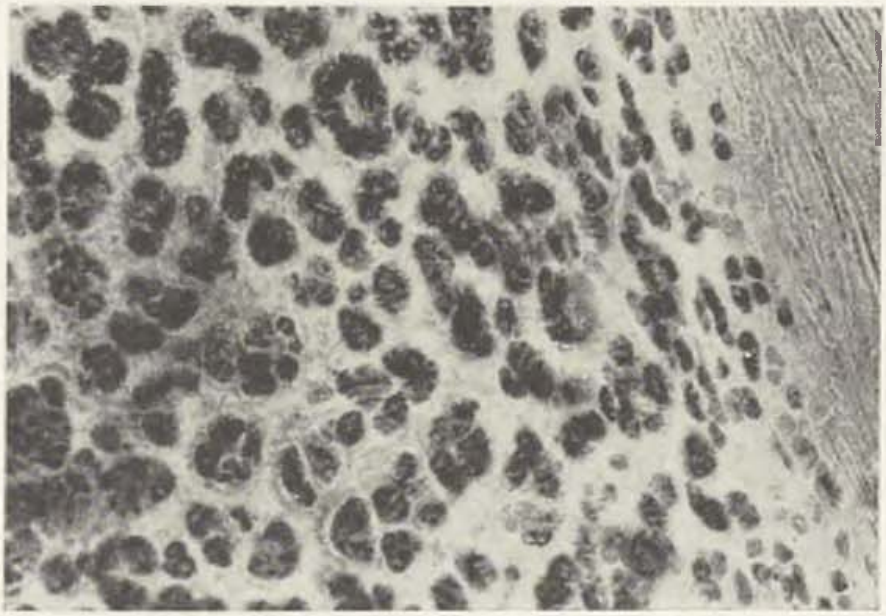

Fig. 1. Homologous cartilage graft sterilized with formalin vapours seven months after implantation. — Stained with haematoxylin-eosin. — Objective 20, ocular 7

tissue had the character of perichondrium. It has been recognized that transplantation of homologous cartilage may be considered successful, if the tissue surrounding the graft does not show any significant inflammatory reaction and the implanted cartilage has preserved its structure and dimensions for a considerable period (Vinogradova, Kovalenko, Yemelyanov, etc.).

The favourable results of transplantation of homologous cartilage sterilized with formalin vapours which had been obtained in experiments, justified application of the same method in patients.

Rib cartilage together with its perichondrium was taken from bodies of people of an age between 20 and 50 years who had died suddenly. The excision of the grafts was carried out with non-sterilized instruments and without any special treatment of the hands. The skin of the thorax was painted with a 5% iodine solution and the hands scrubbed up with soap under running water for one-and-a-half minutes, which means that simple antiseptic measures not requiring special equipment, premisses, sterile towels and trained personel, were employed. This, of course, did not ensure sterility of the grafts, but it greatly diminished their contamination. The thus obtained specimens of cartilage were then treated with formalin vapours by the method described above,

conserved in sterile phials by freezing at — 70 °C and stored at — 25 °C for two to three weeks.

These grafts were used in various reconstructive operations in the face, carried out at the Surgical Clinic of the Central Institute of Stomatology in 14 patients. In six patients, such grafts were used for the reconstruction of auricles, in five patients for the repair of deformations of the nose, and in three patients for the reconstruction of the piriform aperture margin in unilateral congenital cleft of the nose and upper lip.

The cartilage grafts were brought to the Clinic the day before or the very day of operation and immediately immersed in physiological saline containing antibiotics (penicillin and streptomycin). Prior to implantation, small pieces of cartilage were sent for testing their microflora. The cartilage was then given its required shape and placed into the prepared bed. The surgical access was usually made through the skin; only in two patients incision was made from within the oral cavity. The postoperative period was uneventful and the wounds healed by first intention in all patients. On microbiological examination of the pieces of cartilage excised prior to operation, no growth of microflora could be detected.

Up to the time this communication has been written, six months have elapsed since the first and four months since the last operation. Thus the preliminary results of clinical employment of cartilage taken from cadavers without observation of aseptic rules and subsequently sterilized with formalin vapours, may be considered good. Further clinical experience is being collected and the late results are going to be studied.

## CONCLUSIONS

1. Formalin vapours possess considerable antimicrobial qualities.

2. Cartilage sterilized with formalin vapours and used as homologous grafts both in experiment and on patients did not cause any inflammatory reaction and preserved its shape, dimensions and structure for a considerable period.

3. Sterilization of cartilage with formalin vapours is a simple and inexpensive method which may be applied under conditions where aseptic principles for the taking of tissue grafts are impracticable.

## SUMMARY

The possibilities of procuring cartilage for grafting from cadavers without keeping to the rules of asepsis, were studied. Subsequently the tissue was sterilized with formalin vapours at room temperature. The antibacterial qualities of formalin vapours were examined on standard microbial strains. After treating the contaminated tissue with formalin vapours at room temperature for one hour, microbial growth was observed in no case. Cartilage sterilized with formalin vapours and conserved by freezing was implanted

as homologous grafts under the skin of dogs (28 experiments). Seven months after implantation, the cartilage had preserved its shape, dimensions and structure. Cartilage sterilized with formalin vapours was also used in 14 patients in whom various reconstructive operations in the face were carried out. In all cases healing proceeded by first intention. The authors assume that cartilage may be procured for transplantation without keeping to the rules of asepsis (under conditions not permitting such precautions) provided the specimens are subsequently sterilized with formalin vapours.


RÉSUMÉ

**La transplantation du cartilage homologue sterilisé à l'aide de vapostérilisation à la formaline**

K. D. Timachkevitch, G. V. Krutchinskiy

Les auteurs ont étudié les possibilités d'emploi du cartilage obtenu hors des lois de l'asepsie et stérilisé à l'aide de vapo-stérilisation à la formaline à la température de chambre. L'action antibactérielle de la vapeur de formaline fut examinée sur les familles de standard de la flore microbielle. Sur le tissu contaminé ayant été exposé à la vapeur de formaline au cours d'une heure à la température de chambre la croissance de la flore microbielle n'a pas été trouvée dans aucun des cas.

Le cartilage ainsi stérilisé fut conservé par le froid et puis implanté sous la peau du chien (en somme 28 des cas). Dans la période de sept mois le cartilage transplanté a gardé sa forme, sa grandeur de même que sa structure. Le cartilage stérilisé à l'aide de la vapeur de formaline fut de même employé chez quatorze des malades au cours de divers interventions chirurgicales. Dans tous les cas les plaies sont guéries per primam intentionem. Les auteurs sont d'avis que le cartilage — au cas d'impossibilité de garder les lois de l'asepsie au cours de son enlèvement — peut être préparé en tant que greffe à l'aide de la vapeur de formaline.

ZUSAMMENFASSUNG

**Transplantation des homologen, mit Formalindämpfen sterilisierten Knorpels**

K. D. Timaschkevitsch, G. V. Krutschinski

Die Möglichkeiten der Anwendung eines ohne Einhaltung der aseptischen Kautellen gewonnenen Knorpels nach seiner Sterilisierung mit Formalindämpfen bei Zimmertemperatur wurden untersucht. Die antibakterielle Wirkung der Formalindämpfe wurde an Standardstämmen der Mikrobenflora geprüft. Auf kontaminiertem Gewebe, das den Formalindämpfen eine Stunde lang bei Zimmertemperatur ausgestellt wurde, ist Wachstum der Mikrobenflora in keinem Falle festgestellt worden.

Der auf diese Weise sterilisierte Knorpel ist dann durch Tiefkühlung konserviert und hierauf subkutan bei Hunden (insgesamt 28 Versuche) implantiert worden. Sieben Monate lang bewahrte der transplantierte Knorpel seine Ausmasse, seine Form und Struktur. Der mit Formalindämpfen sterilisierte Knorpel wurde auch bei 14 Kranken bei verschiedenen Wiederherstellungsoperationen im Gesicht angewendet. In allen Fällen heilten die Wunden per primam intentionem. Der Meinung der Autoren nach kann der Knorpel — falls zu seiner Gewinnung unter aseptischen Kautellen keine Bedingungen vorhanden sind — zur Anwendung als Transplantat durch Sterilisierung mit Formalindämpfen bereitet werden.

RESUMEN

**Transplantación del cartílago homologo esterilizado por los vapores de formalina**

K. T. Timaskevich, G. V. Kruchinskiy

Se estudiaban las posibilidades de la aplicación del cartílago ganado sin observar las cautelas asépticas después de su esterilización por los vapores de formalina en la temperatura de interior. El efecto antibacteriano de los vapores de formalina se probó en las cepas normales de la flora de microbios. En el tejido contaminado expuesto a los vapores de formalina para el tiempo de una hora en a temperatura de interior no se comprobó al aumento de la flora de microbios ni siquiera en un caso.

E cartílago esterilizado de este modo se conservó después por la mutilación y después se implantó debajo de la piel del perro (28 experimentos en total). En el tiempo de siete meses el cartílago trasplantado conservaba su forma, sus dimensiones y su estructura. El cartílago esterilizado por lor vapores de formalina se aplicó también en 14 enfermos con varias operaciones de reconstrucción en la cara. En todos casos las heridas se cicatrizaron de primera intención. Según la opinión de los autores el cartílago — si no existen las condiciones para obtenerla en las cautelas asépticas — puede prepararse para la aplicación en calidad de trasplante por la esterilización de los vapores de formalina.

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**On October 17th 1970 it will be five years since the sudden death of**

# academician FRANTIŠEK BURIAN

**the founder of the Czechoslovak plastic and reconstructive surgery**

The accomplished, sharp-witted, thoughtful, patient and dilligent young surgeon with considerable manual skill and with special sense towards human tissue, drew — right since starting his work at the Prague Clinic of Surgery — attention of his co-workers by his great interest in reconstructive operations, which in the first years of this century was still quite rare.

1881—1965

He verifies his experiences already during the Balkan Wars in which he participated in the years 1911—13 with a group of Czech physicians, and especially later when he acted as head surgeon in hospitals on the battlefield and in the hinterland during the First World War.

Unsatisfied with the results of the traditional therapeutic methods he introduces new ones, at that time revolutionary methods of treating fractures by extension and abduction by means of instruments of own design. He pays considerable attention to the treatment of war injuries of large vessels. He points out the necessity of early rehabilitation of war invalids and stresses the duty to facilitate their further life through reconstructive operations. Not even the environment of the battlefield prevents him from carrying out plastic operations not only in the face but even on the hands, stumps after amputation even at tissue losses elsewhere on the body. Already in 1912, during the war in the Balkans, he substituted in a small hospital a nose which was shot off by a flap cut out on the thorax, which he connected with a flap prepared on the arm. Thus he gained a large quantity of tissue and a closed flap without uncovered blood areas. Thus he became the predecessor of Filatov and Gillies and their tubed flap.

In the First World War Burian not only treats fresh wounds, he also carries out

difficult and complicated plastic operations in quite a number of soldiers bringing them along to Prague at the end of the war. He has no examples or samples at disposal, he teaches himself and discovers methods which even to-day astonish by their originality. He becomes a real master in solving losses by means of grafts and rotations of tissues from the surroundings of the defect.

After the First World War, Burian pays already attention only to plastic and reconstructive surgery. He fights for the recognition of the new branch by aimful work and his outstanding results. He introduces and elaborates methods applying in his work not only his own experiences but also the experiences of other surgeons as they already are made known more frequently and he starts friendly contacts with these surgeons. He soon starts to apply plastic methods also in children. He is captivated by studies of congenital defects on the face, hands and external genital and starts their treatment. Always with full understanding for the psychic condition of people with cosmetic defects, he ranges these corrective operations amongst his work too.

By dilligent and aimful work he achieves already in 1931 that plastic and reconstructive surgery is recognized in Czechoslovakia as a special branch. With his enthusiasm Burian gains further co-workers and establishes his own school. As a pioneer of a new branch he was obliged to overcome many misunderstandings and difficulties before succeeding that his — so far small and separated work place, is placed within the area of a large hospital. This affords him the possibility of treating even fresh — chiefly loosing accidents in peace time applying plastic methods and also influencing the work of further surgical branches.

The Second World War and the occupation of Czechoslovakia by the Germans, postponed the already prepared incorporation of the Department of Burian in the unit of Charles University. This took only place after the war and in 1948 this Department was changed to a clinical work-place and Burian was appointed as the first University Professor of plastic and reconstructive surgery. The remarkably vivacious man of 70 establishes full of energy, special Departments for Burns headed by plastic surgeons, he achieves compulsory registration of congenital defects on all-state scale and establishes research laboratories for their studies. He and his co-workers turn their attention to research work and he becomes the first clinical genetic. He succeeds in establishing three further University clinics in Moravia and Slovakia and several special departments placing his qualified scholars in charge.

Being aware of the danger of becoming separated and satisfied with ones own work, he quickly renews contacts abroad interrupted by the war, he organizes meetings and work conferences. With great interest and enthusiasm he participates himself in many meetings and congresses abroad. He always appears there with fresh suggestions for co-operation and passes on his extensive experiences verbally and in numerous publications, of which the "Atlas of Plastic Surgery", which was unfortunately only published after his death, is an example of the extent of work carried out by Burian. He gains appreciation and respect not only at home where he was afforded the highest honours, but rightly he is classified in the world amongst the first pioneers of the branch.

Academician Burian always demanded dilligence, responsibility, deep knowledge and good moral qualities of his scholars. He himself was to all of us the greatest example by all his life, he was an unforgettable teacher and friend whom we always remember with love, respects and reverence.

Prof. Helena Pešková, M.D., DrSc., Clinic of Plastic Surgery,
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Fig. 3. Hypoplasia of left maxilla, defect of the back wall of left orbita, elevation of its ceiling. The left orbita is cranio-caudally prolonged. — Fig. 4. Tibia is bent forward and externally on the side of concavity, the corticalis is thickened by periostal apositions. Fibula is hypoplastic and also bent between the bottom and the central quarter.

Fig. 5. Hyperplasia of the right maxilla and body of facial bone, so that the orbits are asymmetrical. Simultaneously however, the zygomatic arch on the right is interrupted by extensive pressure atrophy. — Fig. 6. Pressure atrophy of right half of mandible in medial direction, with hypoplasia of right maxilla and also of part of temple bone.

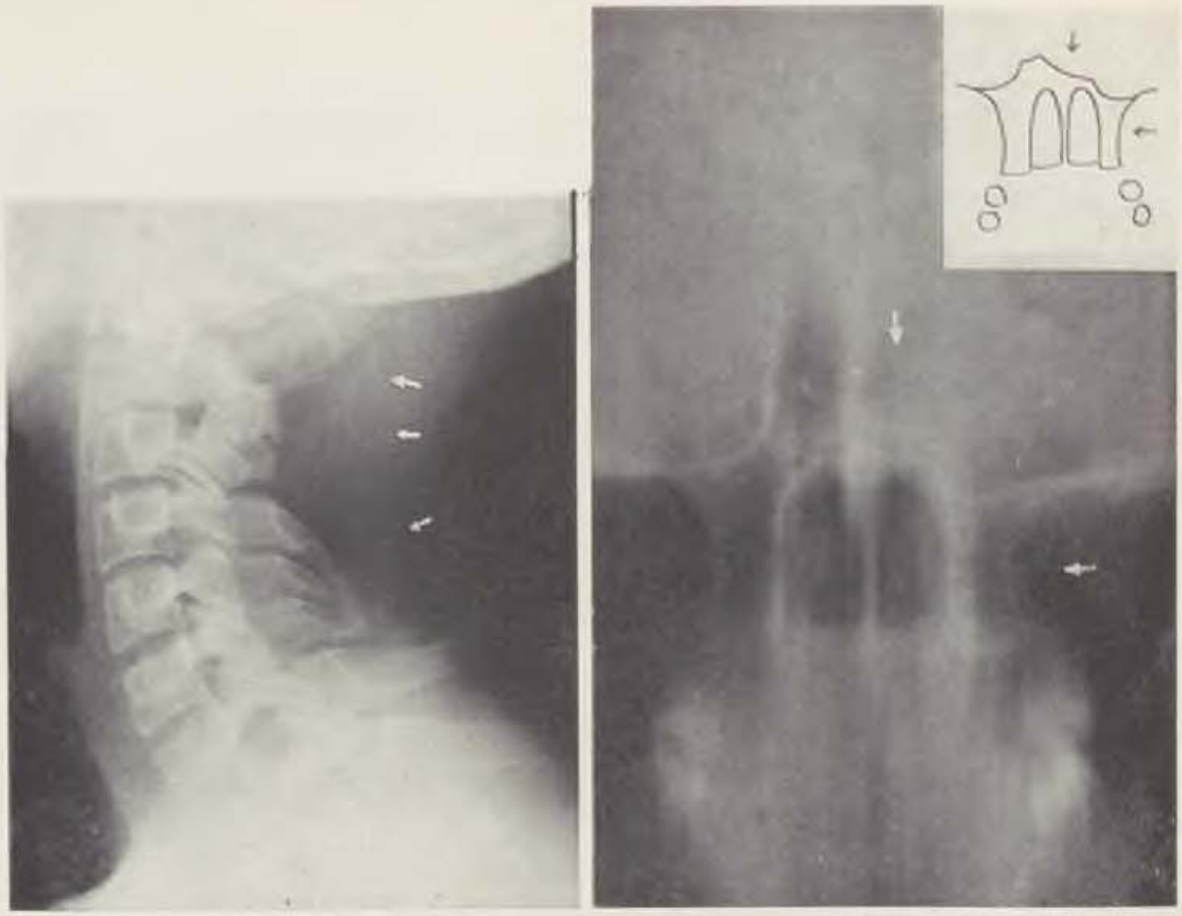

Fig. 7. In the same patient there is a striking thinning of the dorsal atlas support and distance from $C_2$. Processus $C_2$ and $C_3$ defective and $C_{4-6}$ caudally bent. — Fig. 8. Frontal tomogram demonstrates enlargement of sella — especially in forward and downward direction.

Fig. 9. In the sagital layer, striking inclination of the sellar bottom to the left and downwards. Simultaneous hypoplasia of the pterygoid process on the left and lower position of the large wing tends to prove the congenital character of the change. The patient has no signs of acromegaly.

Fig. 10. The surfaces of the spreading peripheral nerves in one sector associate with the formation of connective collagen tissue, whereas in another sector they penetrate and disturb the bone tissue in which reconstruction occurs under activation of osteogenic cells.

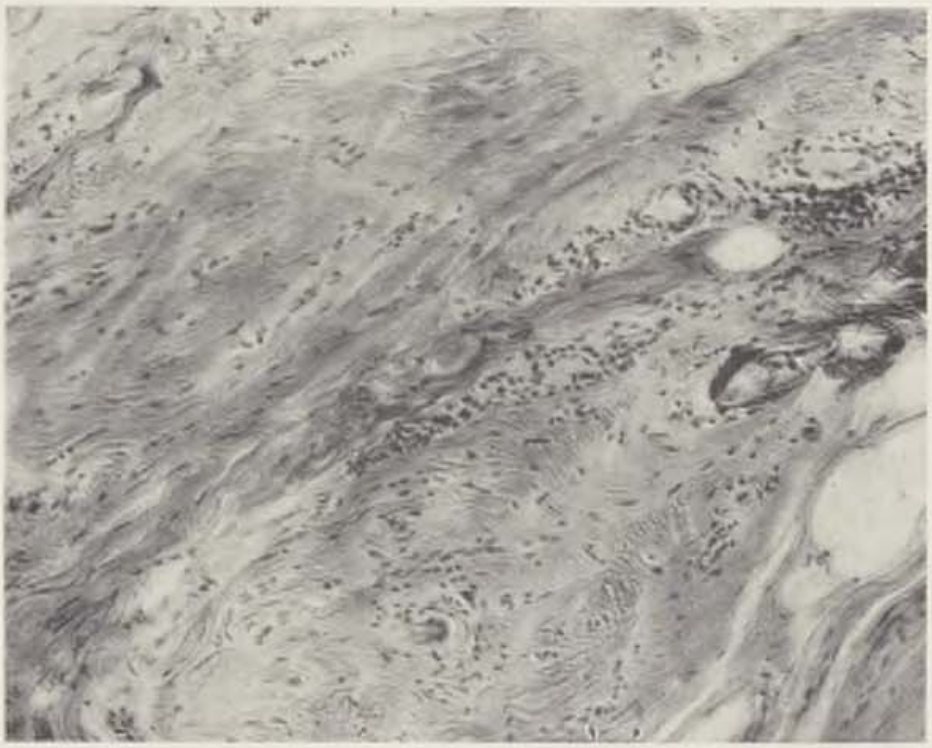

Fig. 11. Fan-like spreading of nervous fibres with richer sarcolema cells, with smaller quantity of collagen fibers, penetrate gradually as substitute growth into f a t t y tissue

Fig. 12. On the tomogram there is a well visible shell-type oval shadow, originating from the edge of the small wing. — Fig. 13. The striking thickening and sclerosis of neurocranial bones contrast with increased gyrification in the unaffected part. The shape of the skull tends to prove craniostenosis. The external contour in the occipital part is not sharp because the neurofibroma is penetrating into the bone. Thickened and sclerotic are also $C_1$ and part of $C_2$

Fig. 14. Hypertrophy of the wall of the right antrum, shell and proc. alveolaris. Slight atrophy on right half of tongue

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