ACTA CHIRURGIAE PLASTICAE

INTERNATIONAL JOURNAL
OF PLASTIC SURGERY

14 · 1
1972

Acta chir. plast. 14 : 1 : 1972

AVICENUM - CZECHOSLOVAK MEDICAL PRESS
PRAGUE

Exclusive Distributors for all Western Countries:
KARGER-LIBRI AG, Petersgraben 15, CH-4000 Basel 11 (Schwitzerland)

Published four times (in 1959: two times) a year by Avicenum — Czechoslovak Medical Press, Malostranské nám. 28, Praha 1. Editor in Chief Prof. Dr. H. Pešková; Deputy of Editor in Chief Prof. Dr. V. Karfík. — Adress of the editorial office: Acta chirurgiae plasticae (R. Vrabec, M. D. — Secretary) Legerova 63, Praha 2, Czechoslovakia. — Orders through ARTIA, Smečky 30, Praha 1. — Press: Středočeské tiskárny, n. p., provoz 01, Hálkova 2, Praha 2

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INTERNATIONAL JOURNAL OF PLASTIC SURGERY

VOLUME 14

1972

CZECHOSLOVAKIA — PRAGUE — AVICENUM

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ACTA CHIRURGIAE PLASTICAE *14*, 1, 1972

Winnipeg General Hospital and University of Manitoba, Winnipeg (Canada)
Department of Plastic Surgery

ANOMALIES OF THE HEAD AND NECK AN ATTEMPT AT CLASSIFICATION

N. I. ELSAHY, L. M. VISTNES

An effective classification of the congenital anomalies of the head and neck has not been devised (1).

In the absence of a plan to classify these anomalies, it becomes a difficult and confusing task, and many of the significant anomalies may be forgotten.

A classification based on etiology is usually satisfactory if it is consistent. Unfortunately many of the anomalies of the head and neck are of unknown etiology. A classification based on the embryological origin of the main features of the anomalies of the head and neck is suggested.

These anomalies may be isolated or associated with other anomalies in other organs or systems e. g., the eyes, C.N.S., musculo skeletal or genito-urinary systems.

I. Origin from 1st and 2nd Branchial Arches or their Derivatives:

a) Failure of fusion or pulling apart:
of the maxillary and mandibular processes of 1st arch:
Known result: lateral facial cleft (2).

b) Underdevelopment may be:

1. Complete:
   i) Unilateral: Known result: Unilateral facial agenesis (1).
   ii) Bilateral: Known result: Bilateral facial agenesis (Treacher-Collins Syndrome) (1).

2. Incomplete:
   i) Affects the mandible and palate
   Known result: Pierre Robin Syndrome (1).
   ii) Affects the 1st brachial pouch:
   Known result: thyroglossal cysts and fistula (3).
   iii) Affects the 2nd & 3rd brachial cleft or pouch (or both):
   Known result: Brachial cysts, sinuses and fistulas (1).

II. Origin from the Fore Brain:

a) Failure of fusion or deficiency of:

1. The medial nasal process and globular process:
   Known result: median cleft lip and bifid nose (4).

2. The medial, lateral and maxillary processes:
   Known result: oblique facial cleft (5).

b) Underdevelopment:

Known result:

a) median cerebrofacial dysgenesis (Arhinencephaly) (6).
b) cyclopia (one central eye) (1).
c) cebocephalia (Monkey head) (1).

III. Origin from the Skull and Cervical Vertebrae:

a) Failure of fusion of:

The frontal bone and the floor of the skull (7).

Known result: craniocarpotarsal dystrophy.

b) Premature closure of:

1. Coronal suture:

Known result: Apert's syndrome (8).

2. Coronal, sagittal and lamboidal sutures:
   Known results: Crouzon's syndrome (1).

c) Delayed closure of sutures:
Known result: cleidocranial dystosis (7).

d) Fusion of cervical vertebrae:
Known result: Klippel-Feil syndrome (1).

e) Hyperossification:

Know results:

1. Hurler's syndrome (7).
2. Infantile cortical hyperostosis (1).
3. Fibrous dysplasia of the jaws (1).
4. Polyostatic fibrous dysplasia. (Albright's disease) (1).

IV. Combination of two or More Abnormalities:

Known results:

a) Trisomy 13—15 (9), 18—21 (10).
b) Branchio-skeleto-genital syndrome (11).

SUMMARY

A classification of the common anomalies of the head and neck based on the embryological site of the main defect has been suggested.

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N. I. ElSahy, M. D., D. S., 1408 - 234 Ronald Street, Vinnipeg, 12, Manitoba, Canada

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Congenital absence of the ear Eric W. Peet, E. & S Livingstone 1971

This small monograph of 39 pages, one third consisting of photographs and figures was being prepared by the author for publication. After his unexpected death, his co-workers Patterson and Batston arranged publication in exquisite graphic finish. The introduction is by Tanzer who recalls the author as one of the outstading plastic surgeons in England who was very much interested in the rather dificult problems of congenital aplasia of the auricle. In short chapters the author deals with pathogenesis, type of deformation of the external and internal ear often associated with deformation of the lower jaw and problems of hearing defects. In conclusion he analyzes 6 operated on cases. Peet considers the age of approx. 8 years to be the most suitable time for reconstruction of the auricle, its growth being then roughly terminated. In his work the author pays utmost attention to the utilization of the aplastic auricle tissue for reconstruction of the ear lobe. For reconstruction of the rigid auricle base he used solely autogenic costal cartilage which he usually processed according to Tanzer. He formed the space behind the auricle by free graft or supraclavicular pedicle flap. Even in unilateral defect, he reconstructed the external auditory meatus by skin graft of medium thickness.

The specialist will read the book with interest and put it away regretting that the author had been unable to continue in these rather difficult problems and to evaluate also the longterm results of the reconstructional operations he had carried out.

Dr. J. Hrivnáková, Clinic of Plastic Surgery, Prague

Research Institute of Mother and Child, Warsaw (Poland)
Director prof. K. Bożkowa, M. D.
Department of Pediatric Surgery
Head prof. W. Poradowska, M. D.

DONOHUE'S SYNDROME (LEPRECHAUNISM) IN A FEMALE INFANT

W. PORADOVSKA M. JAWORSKA, I. HANC

This syndrome was first defined and described in two sisters by Donohue and Uchida in 1954 (3). Since that time, 9 other patients were reported. Recently, Leprechaunism has been included to the official list of well defined syndromes (1, 9). Diagnosis is however still based on characteristic phenotype as the most elaborate laboratory and histologic investigations failed to reveal any common causative mechanism responsible for developmental disorders (2, 5, 6, 8, 10).

The purpose of this paper is to report a successive child with cardinal features of leprechaunism.*)

CASE REPORT

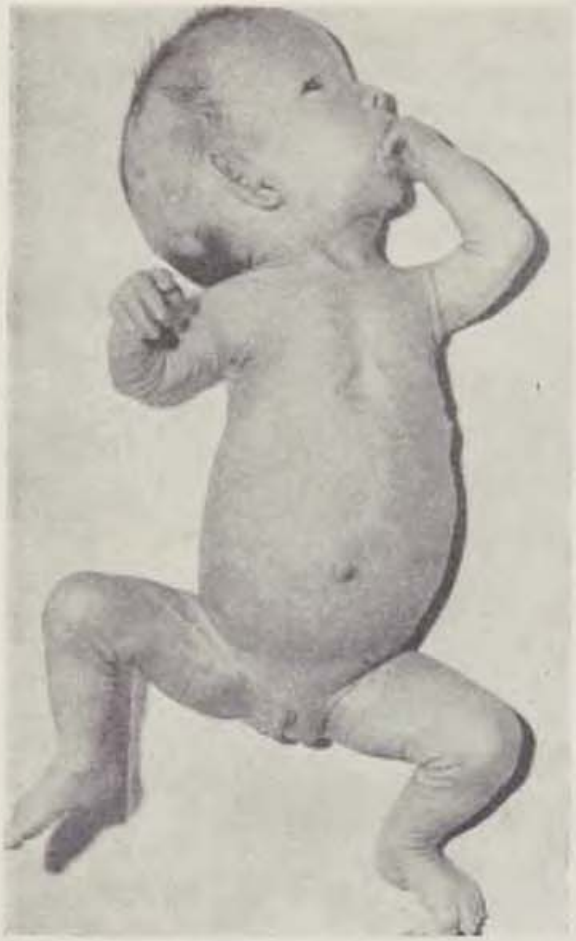
A. S., a female infant had been treated in a country district hospital because of pneumonia and pyodermitis. At the age of 3 months, she was referred to our center for consultation with diagnosis of atrepsia and foetal chondrodystrophy.

The child was born at term as a product of the second uncomplicated pregnancy. Her parents were young and healthy. They denied to be related though consanguinity cannot be excluded as they both are native inhabitants of a small isolated village and intermarriages between their families are likely to occur in the past. The elder daughter had brachydactyly in both hands and the father had wide set eyes with antimongoloid slant of palpebral fissures. Otherwise they both were physically and mentally normal.

Clinical findings (Fig. 1, 2)

Though the girl weighed at birth 3200 g and was 49 cm long, she made a very slow progress in the first three months of her life, only 70 g and 3 cm respectively. She was still highly susceptible to infection (multiple abscesses on the head).

*) Leprechaun means "A pigmy sprite in Irish folklore", according to Shorter English Dictionary (4). The patients have some of the features of these mythical dwarfs.



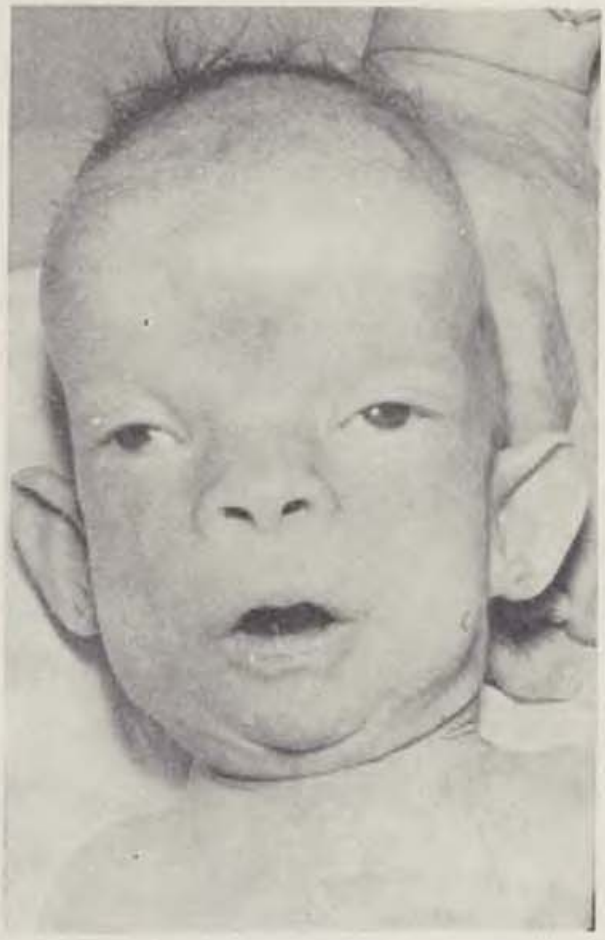


Fig. 1. Patient aged 3 months. — Fig. 2. Patient aged 3 months

Head

Dolichocephalic deformity of the skull and increased width of the cranial sutures. Facies appeared long and pinched. Big flat haemangioma on the forehead. Eyes normal, widely set apart (hypertelorism) with epicanthal folds. Small retuse nose with flared anteverted nares. Mostly open mouth, rather thick lips, small oral cavity with high arched palate. Receding chin. Very large, low set "bat-like" ears (Fig. 3).

Short neck

Chest and abdomen

Poor musculature of the chest and slightly protruded abdomen. No abnormalities within thoracic and abdominal organs.

Skin

Excessive amount of the skin lying in deep loose folds (Fig. 4).

Extremities

Unusual "foetal" appearance of hands (Fig. 5). Brachydactyly. Rudimental distal phalanges of all digits, especially of both small fingers.

External genitals

Slight enlargement of clitoris and labia majora.

Radiologic examination: retarded bony maturation, complete abscence of carpal centers. Neurologic examination: generalized hypotonia. Marked retardation of psycho-motor development.

Fig. 3. Characteristic "bat-like" ear

Chromosome culture of the peripheral blood revealed normal karyotype: 46, XX. Electrocardiogram and electroencephalogram were normal.

The child was again hospitalized 5 months later in order to perform more detailed investigations. She was still seriously undernourished and dwarfed and suffered from multiple abscesses of the skin.

Anthropometric examination at the age of 8 months:

Body height and chest circumference were found less than 90 (5) centile according to data for female children in Polish population.

Body measurements based on Doumic-Décourt morphogram corresponded to the age: body weight — 2 months, subcutaneous fat tissue — one month, body length — 3 months, crown-rump length 4—5 months, chest circumference — 2—3 months, shoulder girdle — 2 months, pelvic girdle — 2—3 months, length of upper limbs — less than one month, length of lower limbs — 1—2 months.

Laboratory studies

Urinalysis normal. Hematologic picture normal except for reccurrent sideropenic anaemia. Serum electrolytes, urea, alcaline phosphatase as well as serum protein-bound iodine were within normal limits.

Nitrogen balance indicated its normal absorption from intenstinal tract. There was a mild generalized hyperaminoaciduria but urine amino acid levels determined by paper chromatography were normal. Urinary creatinine was

elevated. There was remarkably low excretion of hydroxyproline — 13,9 mg/24 h as compared with normal — about 40 mg/24 h.

Fasting sugar and oral glucose tolerance tests failed to reveal any abnormality. There was also normal mobilization of serum free fatty acids. Other serum lipids as well as cholesterol and phospolipides were normal. Excretion of fats in the stools was found to be merely 5 per cent of their intake.

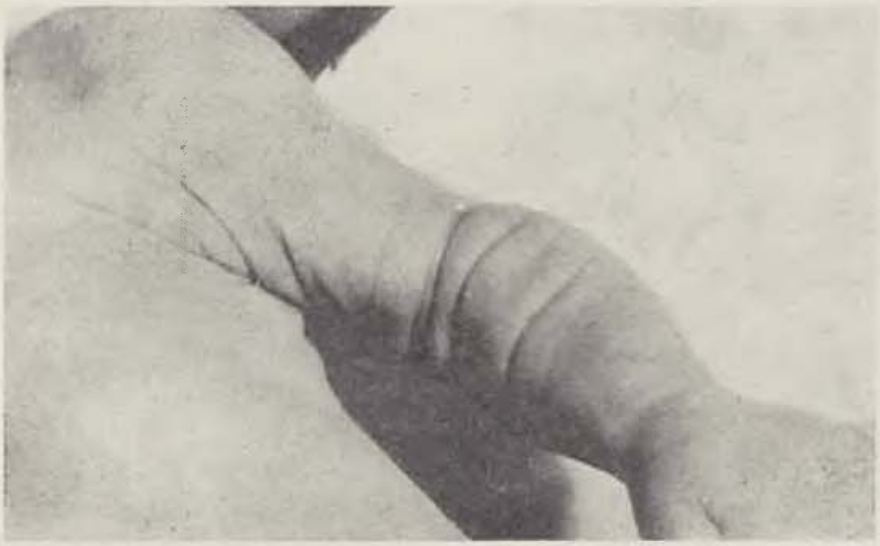


Fig. 4. Abundant folded skin

Urinary 17-hydroxysteroids — 0,81 mg/24 h and 17-ketosteroids — 0,25 mg/24 h (both values within normal limits).

Histologic examination of specimens taken from muscles and skin failed to show any definite abnormalities.

DISCUSSION

Though leprechaunism seems to be a rather well defined clinical entity, some disagreement exists in respect to certain features. Our patient has all the descriptive requirements except the lack of excessive lanugo or hirsutism.

Age

Young infants, aged 3—15 weeks predominate. Two were 7 and 14 months old respectively (2, 8) and 30-month old girl was the oldest in the whole series (4). All children were born at term.

Sex

The first 4 cases were all girls and it was supposed that the condition was limited to females. Further reports in 4 boys (2, 6, 7, 8) indicate, however, that either sex may be involved.

Face and ears

Unusual grotesque facial appearance with largs "bat-like" ears was a constant feature with one exception. The second 2 year and 6 month-old girl

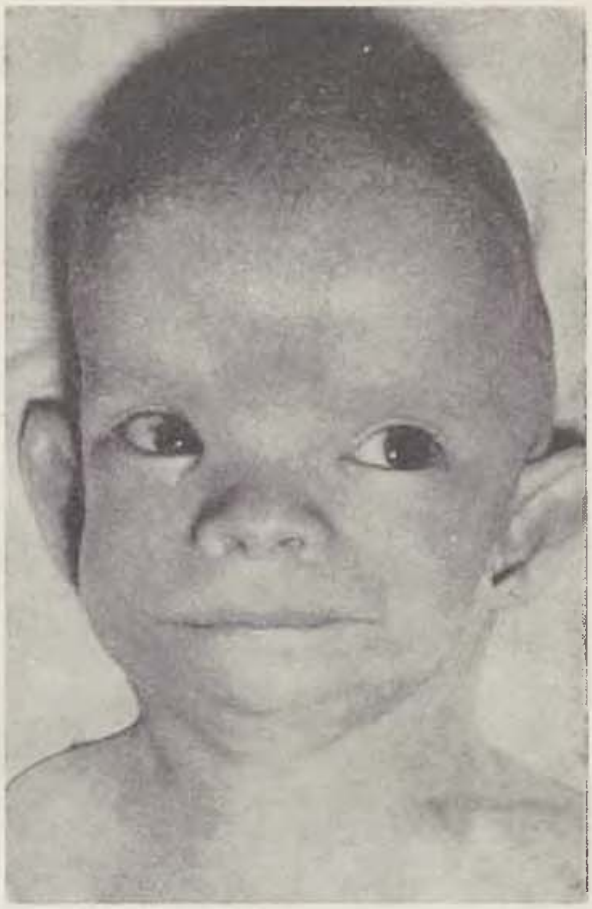


Fig. 5. Patient aged 8 months — short brachydactylic hand, rudimental distal phalanges are not visible. — Fig. 6. Patient aged 8 months — no essential change in the unusual facial appearance

reported by Evans (4) had a quite normal face as well as normal skin and is regarded as doubtful example of the syndrome (10). The authors suggested that facial appearance might undergo change towards normality with advancing age. Observation of after patients disagrees with this opinion. Our child's face, for instance, remains unchanged at the age of 8 months (Fig. 6) as well as on the last control visit, 6 months later.

Failure to thrive leading to marasmus

Low birth weight is not a regular feature. In few cases, it was within normal limits and one child (6) weighed as much as 4200 g. Failure to thrive resulting in severe atrepsia is, however, a constant finding in all reported cases, and Hungarian sisters (5) weighed even less at the time of their death (3 and 6 weeks respectively) than in immediate postnatal period. Our girl continued to be considerably undernourished despite administration of a high caloric diet and no serious feeding troubles. This fact remains unexplained as the absorption from intestinal tract was found undisturbed. There was also no evidence of losing protein and sugar in the urine or fat and protein in the stools.

Dwarfism and delayed skeletal maturation

All reported children were generally born with low body length as well as with retarded skeletal development. They subsequently made a very slow progress and were defined by most authors as dwarfs. The slow growth, delayed ossification and hypersensitivity to insulin suggested that there was a deficient production of growth hormone by the pituitary (4). In our patient, low body length was mainly due to the remarkable shortness of the lower and particularly of the upper limbs, the crown-rump length being relatively more advanced. It is inconsistent with harmonious reduction of all body proportions characteristic for pituitary dwarfs and more likely is related to the complex endocrine and metabolic disorders, which may be also responsible for retardation of psycho-motor development.

Loose, abundant skin

Patterson and Watkins (6) found histologic abnormalities of skin, muscles and connective tissue which were seen in cutis gyrata. None of the patients affected with the latter condition was however affected with any clinical features of leprechaunism.

Mental retardation

5 children (ours included) were subjected to Gesell testing and were found to be significantly retarded (2, 4, 6). Electroencephalogram was normal in all of them.

Hirsutism and hypertrophy of external genitals

Both these features are reported in some cases as doubtful or absent and, according to Dekaban (2), are less characteristic components of the syndrome.

Enlargement of breasts and/or hypertrophy of clitoris was found to result from prenatal overproduction of estrogens as indicated by changes in the ovaries (premature folicular maturation). This, by turn, may interfere with the production of growth hormone being thus responsible for retardation of postnatal development (6). Other, still unclear, endocrine disorders may predispose to enlargement of breasts and genitalia seen in some male patients (8).

Associated anomalies

Dolichocephalic skull deformity was not reported in other cases, but the same unusual type of brachydactyly as well as flat haemangioma on the head were also observed in one girl (10) and may be phenotypic variants of the syndrome. Abnormally wide cranial sutures were observed in younger infants. One boy was microcephalic (8).

Post mortem investigations occasionally revealed various abnormalities in the central nervous systems and other organs like thymus, pancreas, liver and kidneys.

Prognosis

All authors agree that the children affected with Donohue's syndrome have no potential for longer survival. Most of them died in early infancy and

the death was attributed to progressive marasmus and infections. A few living infants, our case included, were still followed up in the time of their reporting (4, 6).

Pathogenesis

Our investigations failed to demonstrate any definite abnormality. Elevated urine amino acids and creatinine ought to be rather interpreted as the direct effect of a high protein intake in the diet during hospitalization. Low excretion of hydroxyproline as well as retarded bone age seem to be sencondary to prolonged undernourishment and also to depressed motor activity.

Alteration of carbohydrate metabolism with hypoglycemia (3, 4, 8) has not been evidenced in our case.

It seems very likely that retardation of psycho-somatic development are closely related to some still unknown metabolic or hormonal disturbances (3, 4, 8). Generalized "dyscrasia" of the type seen in Down's syndrome cannot be excluded in the light of present knowledge.

Etiology

Chromosomal studies revealed normal karyotypes in all four examined children (2, 6, 7 and our case).

The syndrome was reported twice in sisters (3, 5). The parents of one couple of sisters (3) and of one boy (8) were first cousins. Parental consanguinity cannot be excluded in our case as well as in two others — in one boy (6) and in a second couple of sisters (5) for the same reason (isolated rural population). It suggests recessive autosomal inheritance as a possible etiological factor.

In our case, mild hypertelorism in the father and brachydactyly in the sister cannot be interpreted as abortive forms of the syndrome, it is most likely to be coincidental.

No data are available to suggest the teratogenic role of environmental influences.

SUMMARY

Leprechaunism is a rare syndrome of still unknown etiology and pathogenesis. Its characteristic disorders are: unusual, grotesque facial appearance (hypertelorism, retuse nose with flaring nostrils, small mouth, micrognathia, large, "bat-like" ears, short neck, failure to thrive, dwarfism, abundant skin forming deep loose folds, retardation of skeletal and psychomotor development. Less regularly: enlargement of external genitals as well as hirsutism or excessive lanugo. Most of the patients die in early infancy and the death is attributed to progressive marasmus and infection.

The authors described a 3-months old female infant with this syndrome and performed comparative analysis of clinical picture with eleven children reported so far in the literature.

RÉSUMÉ

Donohue syndrôme (leprochaunismus) chez une filette

W. Poradowska, M. Jaworska, I. Hanc

Leprechaunismus est un syndrôme très rare à l'étiologie et pathogénése encore inconnue. Les signes charactéristique en sont le visage d'apparition ridicule, l'hypertelorisme, le nez soulevé aux nostrils en prominence, une petite bouche, micrognathie, les oreilles trop grands en chauve-souris, le col court, le développement retardé, la taille petite, trop de peau formant des plis profond et moux, le développement des os et psychomotorique retardé. Moins souvent, on trouve le génital extérieur trop grand, hirsutismus ou lanugo abbondant. La pluspart des malades meurt à l'âge précose et la mort est suite du marasmus progressif et de l'infection.

Les auteurs démontrent une fillette de 3 mois atteinte de ce syndrôme en comparaison avec 11 des cas jusqu'alors cités dans la littérature.

ZUSAMMENFASSUNG

Das Donohue-Syndrom (Leprechaunismus) bei einem Mädchen

W. Poradowska, M. Jaworska, I. Hanc

Der Leprechaunismus ist ein seltenes Syndrom mit stets noch unbekannter Ätiologie und Pathogenese. Die charakteristischen Merkmale dieses Syndroms sind: ungewöhnlich komisch aussehendes Gesicht, Hypertelorismus, nach oben gehobene Nase mit prominierenden Nasenlöchern, kleiner Mund, Mikrognathia, grosse „Fledermausohre", kurzer Hals, ungenügende Gedeihung, Verkümmerung, „überflüssige" Haut mit der Bildung tiefer loser Falten, verspätete Knochen- und psychomotorische Entwicklung. Weniger häufig: Vergrösserung des äusseren Genitalorgans, Hirsutismus, oder übermässige Lanugo. Die meisten Patienten sterben im frühen Kindesalter und der Tod ist die Folge von progressivem Marasmus und Infektion.

Die Autoren beschreiben ein drei Monate altes, mit diesem Syndrom befallenes Mädchen und führen an die vergleichende Auswertung des klinischen Bildes weiterer 11 Kinder, die bisher in der Litteratur veröffentlicht wurden.

RESUMEN

Donohue síndroma (Leprecaunismo) en una muchacha

W. Poradowska, M. Jaworska, I. Hanc

Leprecaunismo es un síndroma raro con la etiología y la patogenesis hasta hoy desconocida. Los rasgos característicos de este síndroma son: La cara desacostubrada parecida ridículamente, el hipertelorismo, la nariz arremangada con los ojetes de la nariz prominentes, la boca pequeña, micrognathia, las orejas grandes „de murciélago", el cuello corto, la properidad insuficiente, la atrofia, la piel „excesiva" que forma las algas profundas libres, el desarrollo huesoso y psicomotórico atrasado. Pocas veces: El ensanchamiento de los órganos genitales exteriores, el hirsutismo o lanugo excesivo. La mayor parte de los pacientes muere en la infancia temprana y la muerte es a consecuencias del marasmo progressivo y de la infección.

Los autores describen una muchacha de edad 3 meses afectada con este síndroma e indican la valorización comparativa del cuadro clínico de otros 11 niños publicados hasta hoy en la literatura.

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Prof. W. Poradowska, M. D. Kasprzaka 17, Warsawa, Poland

The next annual meeting of the American Society for Aesthetic Plastic Surgery, Inc., will be a one week cruise beginning May 20, 1972, from the port of Miami. aboard the brand new M/S Southward, visiting the ports of Jamaica, St. Thomas and Puerto Rico.

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Czechoslovak Academy of Sciences, Laboratory of Plastic Surgery,
Director Prof. V. Karfík, M. D., DrSc.

THE INCIDENCE OF CLEFTS OF THE PALATE (LIP AND PALATE) IN SYNDROMES AND ATYPICAL FACIAL CLEFTS

M. FÁRA, J. HRIVNÁKOVÁ, O. KLÁSKOVÁ

The incidence of typical facial clefts is usually stated at the ratio 1:550 to 1:650 new-borns. It was about 1:540 in Czechoslovakia in the last years.

Sometimes the cleft is accidental, at other times it is the consequence of lawful heredity.

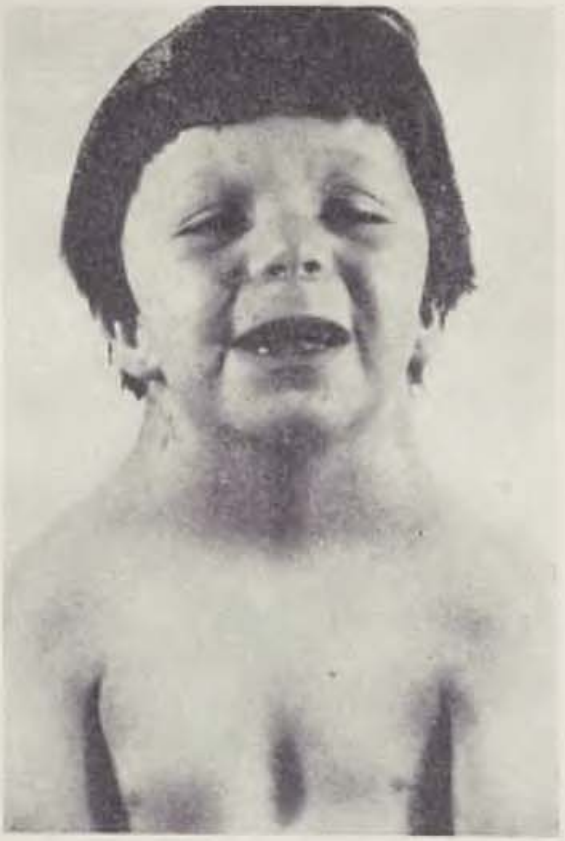


Fig. 1. Klippel-Feil's syndrome. Patient D. V., case history No. 56.252. Main symptoms: short neck with low based hair margin, deformation of cervical vertebrae, pterygia colli. Associated cleft of soft and hard palate.

In rare cases the typical facial cleft manifests as the unchangeable symptom of a certain syndrome (for ex. the cleft of the palate in P. Robin's syndrome).

A special place is taken up by clefts of the palate, possibly of the lip, alveolus and palate, which occur inconstantly in connection with other heavy defects in head and neck. Their origin is evidently connected with the basic deformations.

Fig. 2. Appert's syndrome. Patient P. D., case history No. 68.134. Main symptoms: dysostosis of scull, hypertelorism, flat orbits, exophtalmus, complete syndactylia of hands and legs. Associated cleft of soft palate.

Such an association of a typical cleft with some syndrome or atypical facial cleft, is sometimes considered to be exceptional, at other times it is almost general. The opinion on stating the incidence of the mentioned combination, differs rather considerably.

One of the reasons is that all the defects are extremely rare and the authors do not always have a sufficient number of cases at disposal which — if analysed — could lead to generally valid conclusions.

Because the Clinic of Plastic Surgery in Prague afforded in its 50 years of existence treatment to 6000 cleft patients and to a relatively large number of individuals afflicted with various congenital defects of head and neck, we should like to contribute to the clarification of some laws in the discussed problem, by analysing this clinical material.

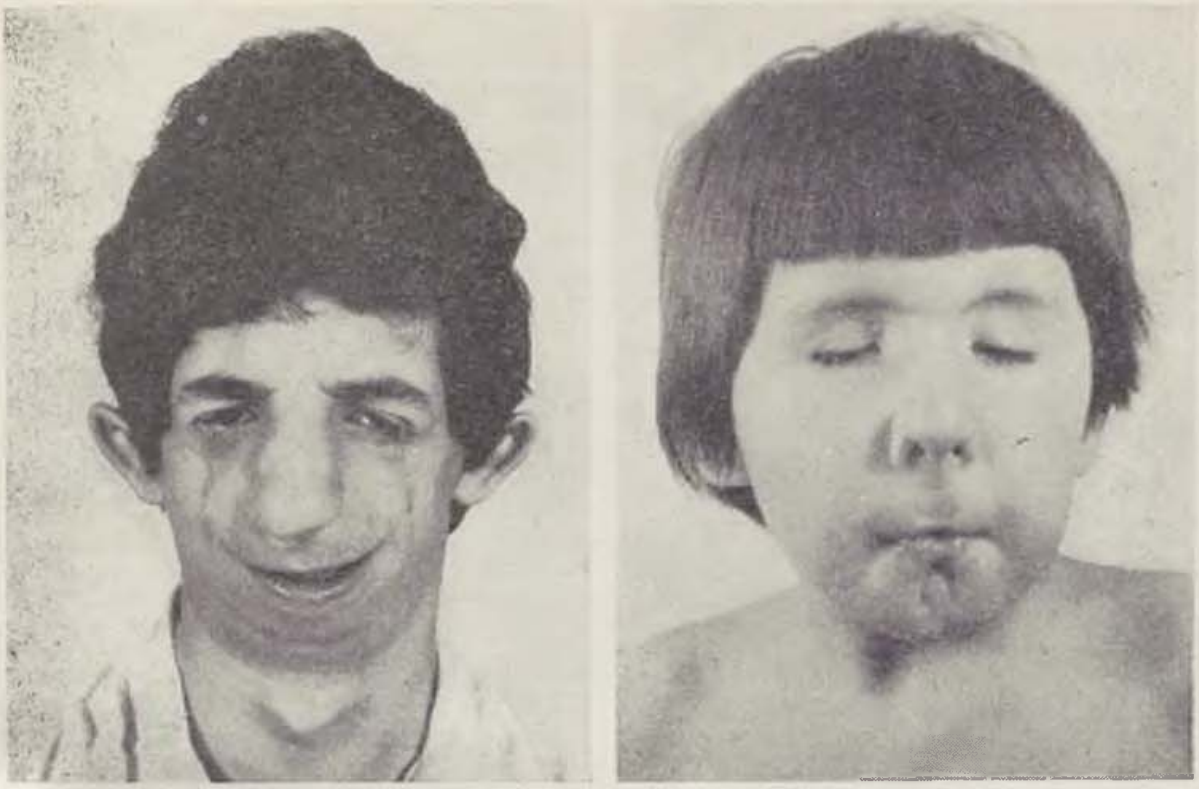


Fig. 3. Treacher-Collin's syndrome. Patient L. B., case history No. 80.028. Main symptoms: antimongoloid course of eye slits, coloboma of lids, macrostomy with open occlusion, hypoplasia of maxilla with minimal cavities, hypoplasia of mandible, birds profile, deformation of ears, atresia of auditory meati. Associated submucous cleft of palate. — Fig. 4. Whistling face syndrome. Patient E. K., case history No. 46.785. Main symptoms: ptosis of lids, strabism, narrowed nostrils and auditory meati, small pursed mouth, arthrogryposis, deformation of the lower extremities, hernias.

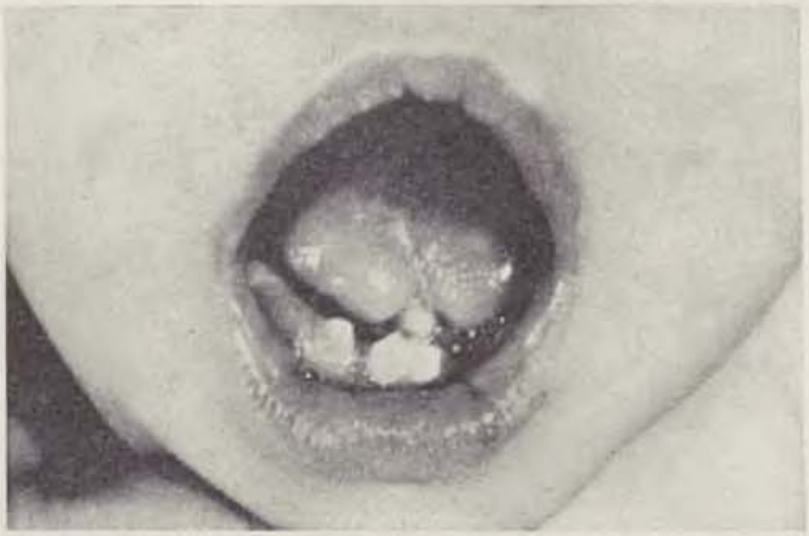


Fig. 5. Orofaciodigital syndrome. Patient J. P., case history No. 60.685. Main symptoms: hypertelorism, small narrow nose, medial pseudocleft lip, cleft tip of the tongue, multiple accessory vestibular frenula, dystopia of the incisors with infra-occlusion, alopecia, poikilodermia, kyphosis of scull base, syn-klinodactylia, mental retardation.

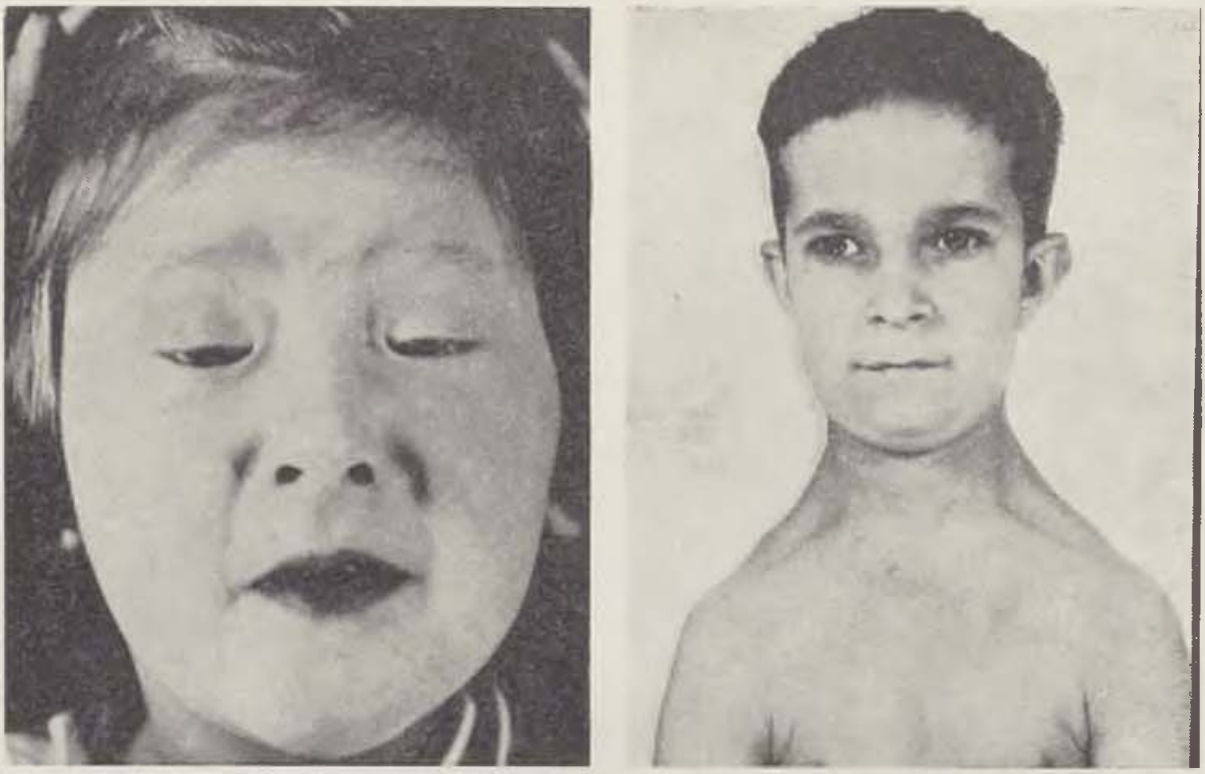


Fig. 6. Dysmorphia palpebroorbitalis. Patient M. S., case history No. 4.755. Main symptoms: ptosis of lids, phimosis of eye slits, hypoplasia of upper and lower lids, flattening of the supraorbital region, epicanthus, disturbance of ocular muscles. — Fig. 7. Dysmorphia otofaciocervicalis. Patient J. T., case history No. 66.528. The main symptoms result from developmental disorders affecting the region of all five branchial arches and clefts: affect of the internal, medial and external ear (deafness, deformation of auricles, fistules), hypoplasia of the maxillo-zygomatic complex, cervical fistules and hypoplasia of some cervical muscles manifesting in dropping of brachial girdle and pseudopterygia.

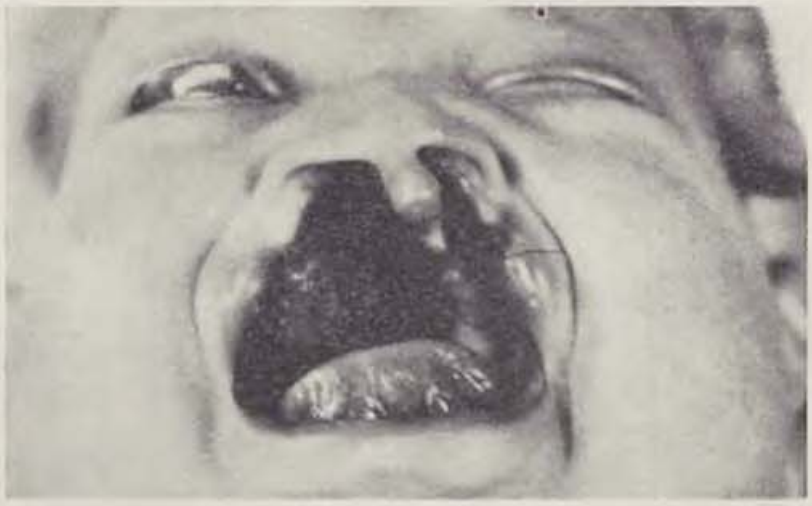


Fig. 8. Ectodermal facial dysplasia. Patient M. K., case history No. 69.464. Main symptoms: thin rigid skin, alopecia, hypoplasia of the upper and lower lids, ectropium of the upper lids, dermoidal cysts, anodontia. Associated bilateral cleft of the lip, alveola and palate with intermaxillary agenesis.

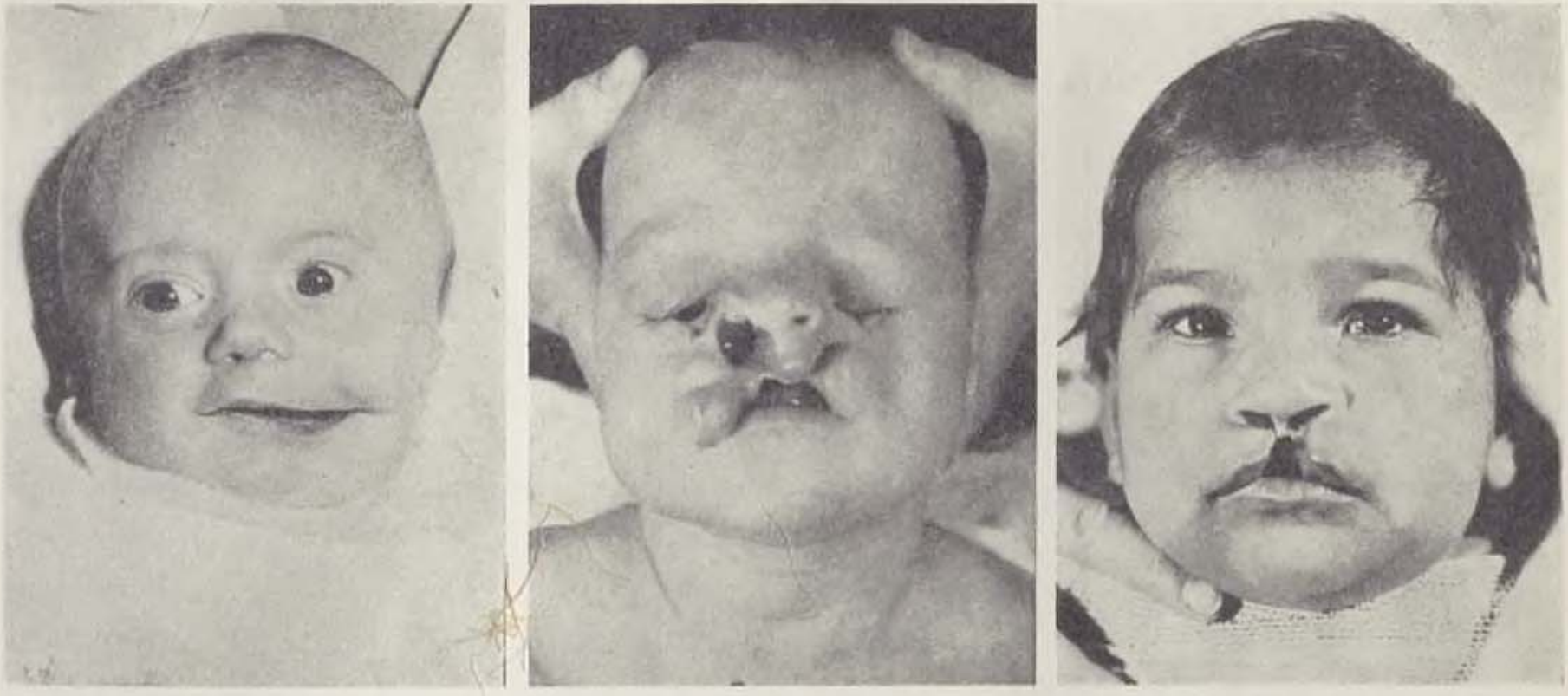
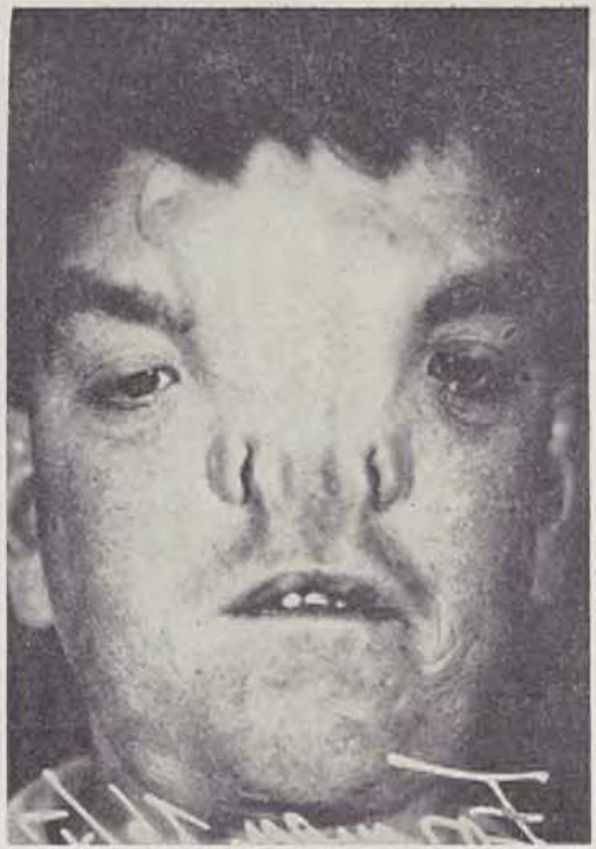


Fig. 9. Transverse cleft of the face. Patient T. P., case history No. 80.797. The main symptoms are the sequel to imperfect fusion of the maxillary and mandibular processus: cleft of the oral angle, hypoplasia of one half of the face in soft tissues and in the bones, anomalies of the ear. Associated cleft of the soft palate. — Fig. 10. Oblique cleft of the face. Patient J. P., case history No. 38.346. Main symptoms are the sequel to imperfect fusion of the central nasal, lateral nasal maxillary processus: cleft reaching from lip over the face into orbital region. Bilateral cleft of lip, alveole and palate. — Fig. 11. Median cleft of the lip. Patient A. D., case history No. 29.215.

Table 1

Basic defect	Number of cases	Associated cleft			%	Gothic palate	Familial incidence of cleft defect
		of palate		of lip, alveolus, palate			
		open	submucous				
Klippel-Feil	13	8	3	1	92,3	1	–
Appert	7	5	–	1	85,7	1	–
Treacher-Collins	6	2	1	–	50,0	–	–
"Whistling face"	4	1	–	–	25,0	2	–
Dysmorphia orofaciodigitalis	2	1	–	–	50,0	1	–
Dysmorphia palpebroorbitalis	25	1	–	–	4,0	4	–
Dysmorphia otofaciocervicalis	4	–	–	–	–	4	–
Dysplasia ectodermalis faciei	1	–	–	1	100,0	–	–
Transverse cleft	29	3	1	5	31,0	1	transverse cleft 2×
Oblique cleft	14	–	–	7	50,0	–	oblique cleft 1× typical cleft of lip 2×
Median cleft of lip	13	–	–	–	–	1	–
Median cleft of nose	18	–	1	–	5,5	4	–
Cleft of mandible	2	–	1	–	50,0	–	–
Doubled nostril	3	–	–	2	66,7	–	–



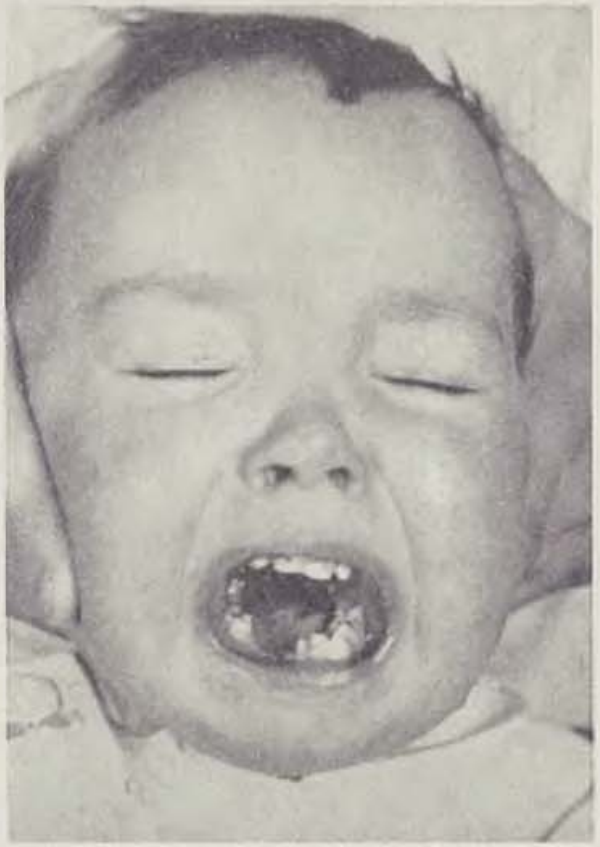


Fig. 12. Median cleft of the nose. Patient V. F., case history No. 1.449. Associated submucous cleft of the palate. — Fig. 13. Cleft of the mandible (right-sided, incomplete) with microglossia. Patient M. O., case history No. 57.653. Associated submucous cleft of palate. — Fig. 14. Doubled nostril. Patient I. K., case history No. 27.916. Combined with total left-sided cleft.

DISCUSSION

Approximately each fiftieth facial cleft (of the palate or more rarely of the lip, alveolus and palate) occurs in connection with heavy and mostly multiple defects affecting different parts of the body, repeating themselves regularly in form of syndromes. The cleft has been reported in almost fifty such connections so far.

Our studies concern rare congenital defects which are the sequel to developmental deviations manifesting in the region of head and neck. The associated typical cleft of palate or lip, alveolus and palate, may be in some cases primarily conditioned parallel to basic large deformations by the same causes. We attribute this mainly to insufficient growth ability of the mesenchyma or to limitation of the motional abilities of the elevating palate plates.

We may assume however that the associated clefts — mainly cleft of the palate — may be easily also the sequel to changes in shape only, which were induced on the head skeleton by the basic defect. If the head or neck region developed in wrong proportions already when the horizontalisation of the palate plates is about to be concluded (i.e. towards the end of the third embryonal month) the growing together of the palate halves may be prevented for ex. by excessive width of the skull, underdevoloped mandible, large tongue or atypical cervical vertebrae. These individual symptoms accompany in fact the syndromes in which cleft of the palate often occurs.

Association of the cleft and namely of the palate cleft with rare congenital defects of head and neck is thus relatively frequent and in many cases a phenomenon which may be easily explained. Surgical treatment is sometimes complicated by the anatomic peculiarities in the operated on region and phoniatric rehabilitation meets with even greater difficulties. Abnormal conditions in the oral cavity, nose and throat as well as possible deafness and mental retardation make reeducation in speech rather difficult. Satisfactory rehabilitation of individuals who underwent cosmetic treatment successfully, can be however only afforded if the speech had been corrected. It is from this fact that the importance of early differentiation and the proper therapy of cleft palate which is the accompanying inconstant phenomenon in syndromes, results.

SUMMARY

Of 141 individuals with rare congenital defects of the head and neck, 45 were simultaneously affected by cleft of either the palate (28 cases) or of the lip, alveolus and palate (117 cases). In some deformities there was an almost general simultaneous incidence of cleft (for ex. the Klippel-Feil's syndrome in 92,3%) in others it was quite exceptional (for ex. in dysmorphia palpebroorbitalis in 4%). The importance of early differentiation and suitable therapy of cleft palate in order to rehabilitate — socially — persons thus seriously afflicted, is being stressed.

RÉSUMÉ

Les fentes en tant que complications des syndrome divers. L'existence des fentes du palais et des becs-de-lièvres chez des divers syndromes de même que chez des fentes de la face atypiques

M. Fára, J. Hrivnáková, O. Klásková

De 141 des atteints des défauts innés rares de la tête et du cou 45 étaient de même atteints de la fente du palais (28 cas) ou du bec-de-lièvre, des mâchoires et du palais (17 cas). Tandis que chez quelques-uns défauts la fente était presque toujours présente, (sy. Klippel-Feil en possède p. ex. 92,3%), chez d'autres sa présence est toute exceptionelle (p. ex. chez dysmorphia palpebroorbitalis seulement 4%). Les auteurs soulignent la nécessité de la récognition et de la thérapie respective des fentes pour la réhabilitation sociales des pauvres atteints.

ZUSAMMENFASSUNG

Spalten bei Syndromen. Das Vorkommen der Gaumenspalte (Lippen- und Gaumenspalte) bei Syndromen und atypischen Gesichtsspalten

M. Fára, J. Hrivnáková, O. Klásková

Unter 141 Trägern seltener angeborener Kopf- und Halsfehler waren 45 Individuen gleichzeitig mit Spalte entweder des Gaumens (28 Fälle) oder der Lippe, des Kiefers und Gaumens (17 Fälle) betroffen. Während bei einigen Deformitäten das gleichzeitige Vorkommen der Spalte fast allgemein war (z. B. bei dem Klippei-Feilschen Syndrom in 92,3 % der Fälle), war ihr Vorkommen bei anderen Deformitäten (z. B. bei dysmorphia palpebroorbitalis in 4 % der Fälle) nur ausnahmsweise vorzufinden. Hervorgehoben wurde die Bedeutung der zeitlichen Erkennung und zweckmässigen Behandlung der Gaumenspalte für die gesellschaftliche Rehabilitation der auf diese Weise schwer betroffenen Menschen.

RESUMEN

Presencia de la grieta del paladar (la de los labios y del paladar) en los síndromes y en las grietas atípicas de la cara

M. Fára, J. Hrivnáková, O. Klásková

De 141 personas que tienen defectos de la cabeza y los del cuello ingénitos raros, fueron 45 individuos afectados al mismo tiempo con la grieta sea del paladar (28 casos) sea la del labio, del maxilar y del paladar (17 casos). En tanto que en algunas deformidades fue la presencia simultánea de la grieta casi ordinaria (por ejemplo en el síndrome de Klippel — Feil en 92,3 por ciento), en otros fue completamente excepcional (por ejemplo en dismorphia palpebroorbitalis en 4 por ciento). Se acentua la importancia del reconocimiento oportuno y la del tratamiento conveniente de la grieta del paladar para la rehabilitación social de la gente de este modo gravemente afectada.

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Doc. Dr. M. Fára, DrSc., Šrobárova 50, Praha 10, Czechoslovakia

F. Burian, in memoriam.

At a Symposium arranged by the Clinic of Plastic Surgery and by the Research Laboratory, Czech Academy of Sciences, held in Prague on Oct. 12th 1971, the birth of Academician Fr. Burian 90 years ago, was commemorated by his disciples. Cleft defects to which the late prof. Burian dedicated 50 years of his scientific and clinical interest, were selected as the theme. Prof. Dr. V. Karfík, DrSc. recalled this in his speech. The invited friends and co-workers in this field of plastic surgery prof. Dr. Sanvenero Roselli of Milan, prof. Dr. T. Skoog of Uppsala, prof. Dr. P. Fogh Anderson of Copenhagen and the disciple of the Prague School doc. Dr. M. Kraus of Polanica in Poland contributed by their interesting and most valuable reports to the success of this day of commemoration.

Besides the distinguished and charming guests from abroad, disciples of the Burian School, prof. Dr. Š. Demjen of Bratislava, prof. Dr. V. Kubáček, CSc. of Brno, Dr. R. Kluzák, CSc. of Třinec and doc. Dr. M. Fára of Prague reported on their work and research on problems of facial cleft defects. Further four workers from the Laboratory which Academician Burian established at the Clinic, reported on the results of their work in genetic (Dr. M. Tolarová) teratologic (Dr. R. Jelínek) anthropologic (Dr. P. Figalová) and orthodontico-roentgenologic (Dr. Z. Havlová) research which they are carrying out on cleft defects.

The scientifically most valuable Symposium held in a verry friendly atmosphere disclosed that the disciples of prof. Burian are successfully endeavouring to continue the work of their unforgettable teacher whose life-work in plastic surgery and especially in the difficult problems of congenital defects was held in great esteem by the guests from abroad to whom Academician Burian was in much an example, advisor and also a shining symbol.

Prof. Pešková H., DrSc.

Central Scientific-Research Institute of the Soviet Ministry of Health, Moscow (U.S.S.R.)
Director Prof. A. I. Rybakov, member of the Soviet Academy of Medical Sciences
Clinic of Surgical Stomatology.
Surgeon-in-Charge Prof. F. M. Khitrov
Post-Graduate Medical School of the Belorussian Government
Rector A. V. Rutsky
Department of Stomatology
Director G. V. Kruchinskyi

NEW METHOD OF PALATE DEFECT REPAIR

G. V. KRUCHINSKYI

At present, there are two principally different modes of surgical repair of defects in the palate:

a) employment of various variants of mucosa-periosteum flaps around or from the vicinity of the defect,

b) employment of the skin of a Filatov pedicle flap, formed at and transferred from a remote site.

Mode a) comprises a number of methods which are only employed for the repair of small and narrow defects.

Mode b) permits employment of an unlimited quantity of material for the repair of a defect of practically any size. However, there are a number of shortcomings: protracted and many-stage treatment which requires long immobilization of the arm with the flap, a fair percentage of complications, rather complicated procedures of the operation itself, whose performance is reserved to a limited circle of surgeons, etc.

All the methods known hitherto have their shortcomings, and this is why the search for more accessible and reliable methods of palate plasty continues.

In 1956, Klapp et Scharter used a pedicle flap from the tongue for covering the wound in the soft palate left after excision of a carcinomatous tumour. Conley et al. (1957) and Bakamjian (1964) employed tissues of the tongue in the plastic repair of the palate, the pharynx, the cheek and the lower lip, immediately after oncological operations.

In 1963, the Mexican surgeon Guerrero-Santos used lingual tissues for reconstruction of the lower-lip vermilion. His experience suggested the idea of using these tissues as material for the plastic repair of defects in the palate.

Guerrero-Santos and Altamirano (1966) were the first to report on the results of such operations using a pedicle flap formed on the back of the tongue. In order to immobilize the tongue, its tip was sutured to the upper lip. In three out of ten cases, the authors experienced complications after these operations, which they explained by the inadequate immobilization of the tongue. According to their opinion, function of the tongue had not been impaired as a result of the operation.

The surgical procedure of these Mexican surgeons is undoubtedly original, yet neither it is without shortcomings.

First of all, immobilization of the tongue by fixing it to the upper lip, i. e., to a mobile organ, is inadequate, which was already pointed out by the authors themselves. Apart from this, an uncovered wound surface remains on the pedicle of the flap, which easily becomes infected in the oral cavity, and which is difficult of access for treatment during the postoperative period.

In order to improve upon this method, the author of this communication recommends to form a tube of the type of an "acute" pedicle flap from the flap excised on the back or the inferior surface of the tongue. This makes it possible to turn the wound surfaces of the flap and the tongue away from the centre of the oral cavity. Such a lingual flap has all the advantages of a skin pedicle flap, as recommended by Filatov.

Immobilization of the tongue was effected by fixing it to the teeth of upper jaw with threads of non-hydroscopic material fitted with small rubber tubes.

Defects of the hard palate, among them those involving the alveolar process and the vestibule of the mouth, or those on the borderline between the hard and soft palate, constituted the indications for the employment of lingual tissues. The dimensions of the defect should not be smaller than 1.0×1.5 cm, and may reach an average of 1.5×3.5 cm and even more. Practically a defect in the palate of any location can be covered, using the tissues of the tongue. The method is particularly suitable in patients with defects in the palate resulting from uranoplasty, in whom underdevelopment of the maxilla and compensatory enlargement of the tongue can frequently be observed. Diminution of the tongue is, in these cases, a necessary precaution of preventing reopening of the defect and one of the conditions for successful treatment of maxillary deformations.

For children, these operation are unsuitable.

Repair of defects in the palate with an „acute" pedicle flap from the tongue may be carried out under local or general anaesthesia, preferably with intratracheal intubation.

The lining of the nasal cavity can be reconstructed by swinging marginal mucosa-periosteum flaps into the defect (Fig. 1a and b).

The flap is excised on the back of the tongue, starting at the foramen coecum and placing the pedicle at the region of the lingual tip (Fig. 1b). The lateral incisions slightly diverge and reach the margins of the tongue. This leads to the pedicle becoming much broader than the flap itself.

The flap which is excised together with a layer of longitudinal muscles, is mobilized almost to the tip of the tongue. As the flap is dissected, the wound which involves muscle in the central part of the tongue, is sutured with interrupted stitches of thick catgut. This prevents any large loss of blood. The stitches then gradually pass over onto the base of the flap, transforming it into a tube (Fig. 1c).

An „acute" flap formed in this way actually represents a continuation of the tongue and possesses a powerful pedicle.

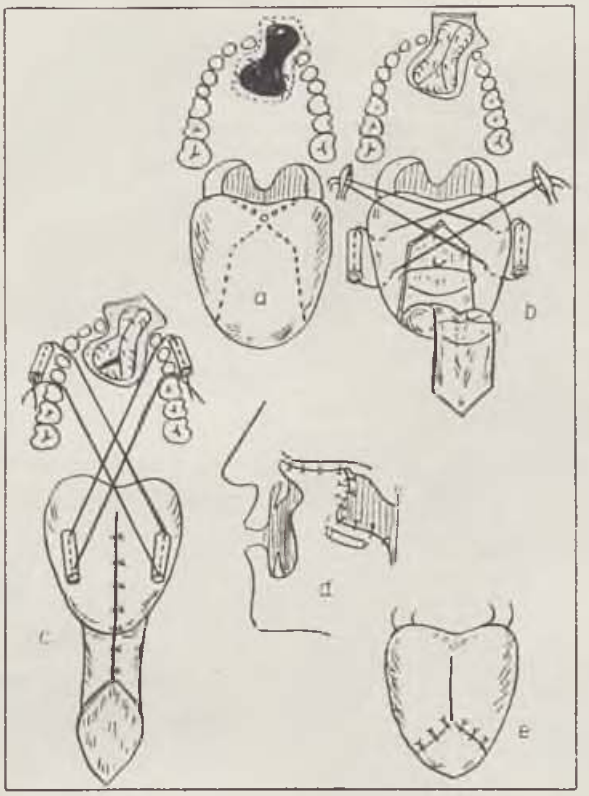


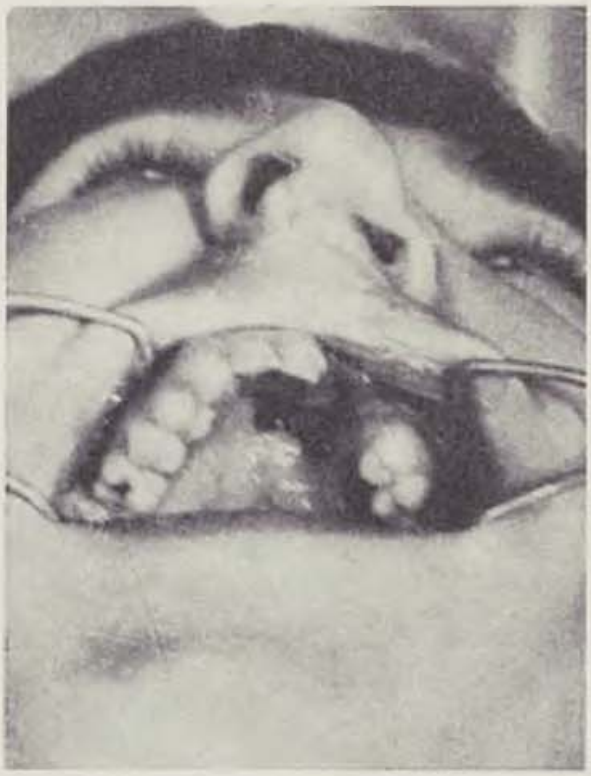
Fig. 1. Diagram of formation of an "acute" pedicle flap on back of tongue for repair of defect in palate: a) interrupted line indicates incisions for excision of flap on back of tongue. Above, mode of reconstruction of lining of nasal cavity from surrounding tissues, b) laid and crossed mattress stitches with rubber tubes threated onto them at lateral surfaces of tongue. First stitches of wound suture on tongue and pedicle, c) flap from tongue sutured into tube pedicle. Mattress stitches led between teeth of upper jaw for immobilization of tongue, d) side view of flap sutured to palate, e) condition of tongue after division of nutritive pedicle.

Then, at both sides of the tongue, approximately at the level of the $\overline{6|6}$ teeth, two mattress stitches of Lavsan or another non-hydroscopic material are laid from underneath, with a short (1 cm) and thin rubber tube threaded onto each of them (Fig. 1b). These tubes serve the prevention of a decubitus developing on the tongue. The mattress stitches whose ends are brought out on the back of the tongue, are crossed, and the ends are threated through between the $\underline{5\,4\,|\,4\,5}$ teeth, which they encircle (Fig. 1c), but are not tied for the time being.

The flap is sutured to the wound edges of the defect in the palate by interrupted stitches. If it is necessary, i. e., if the penetrating defect extends as far, the end of the flap can be brought out into the oral vestibule.

Finally the tongue is immobilized by tying the mattress stitches over small rubber tubes on the buccal side of the two maxillary premolars (Fig. 1d).

In the post-operative period, a raised, preferably sitting, position, fluid food and meticulous care of the oral cavity is recommended for the patient. Dressing of wounds or any device separating the teeth are not required.



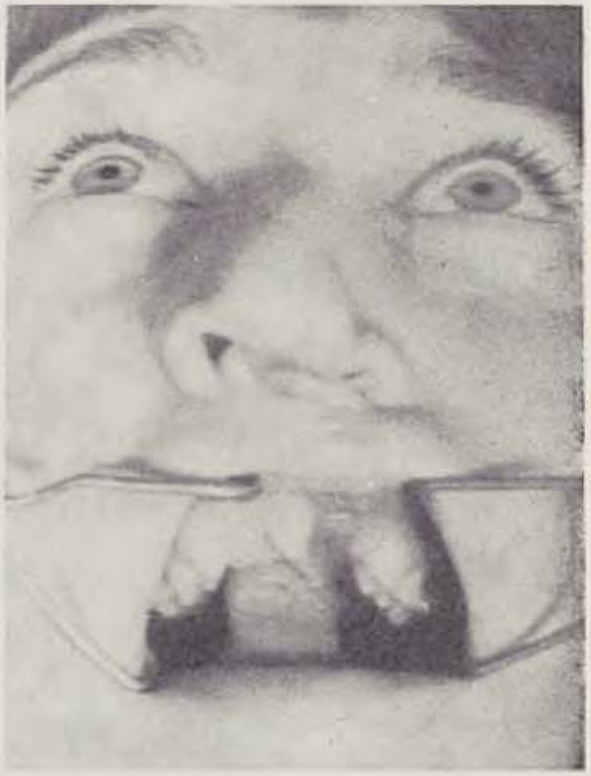


Fig. 2. Patient Ch.: Penetrating defect of hard palate and alveolar process extending into oral vestibule, deformation of nose. — Fig. 3. Patient Ch.: "Acute" pedicle flap from tongue sutured to defect in palate, ten days after operation

In the first days after operation, the patient is fed through a rubber tube introduced into the mouth from the side and behind the pedicle of the flap. The tube which must be rinsed periodically, is left in place for three to four days. After this time, oedema of the tongue starts to recede.

The mattress stitches are removed a week after operation. At the second stage, i. e., 16 to 18 days after the first operation, the pedicle of the flap is divided, plasty of the palate is completed, and part of the lingual tissue is returned to its previous site in the tongue, thus also completing plasty of the tongue (Fig. 1e).

The author performed this operation for the first time in September, 1967.

For illustration, photographs are demonstrated of the patient Ch., a girl aged 16, prior and after operation performed for a residual defect in the hard

palate, which had developed as a result of a previous unsuccessfull cheilo-uranoplasty. The patient also shows severe deformation of the nose (Fig. 2).

The defect in the anterior part of the palate, extending into the oral vestibule, was covered with an "acute" pedicle flap taken from the tongue by the method described above (Fig. 3). In Fig. 4, the condition one year after operation is shown. The defect in the palate has completely been bridged.

The receptors on the tip and the sides of the tongue have practically taken no harm as a result of this operation. The slight diminution of the

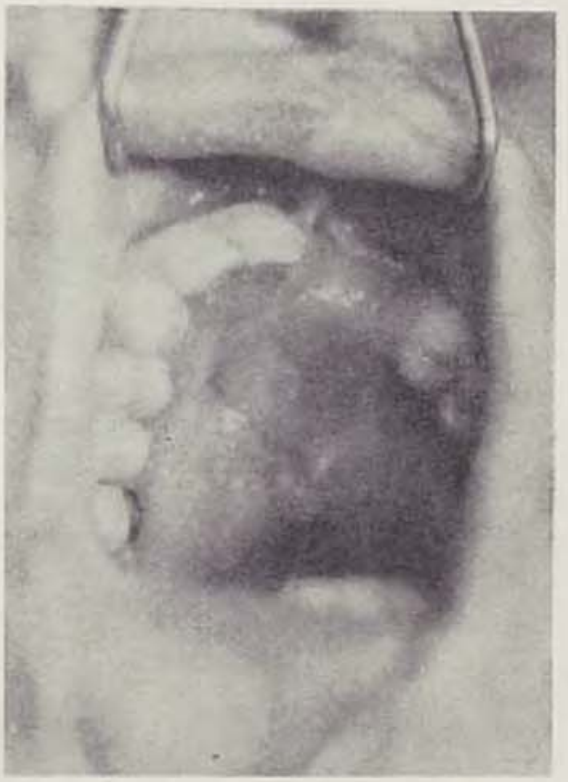


Fig. 4. Patient Ch.: Flap separated from tongue, defect in palate covered, condition one year after operation

tongue has not affected its function, including speech. Uranoplasty using tissues of the tongue has been performed at the Central Scientific-Research Institute of Stomatology in eight patients with invariably good results. The method has received an author's certificate by the Committee for Inventions and Discoveries at the Council of Ministers of the USSR.

The "acute" pedicle flap, together with the tongue, is of considerable length and easily movable, and can, therefore, be brought up not only to the palate, but also to defects of other location.

Employment of tissues of the tongue has, as a matter of fact, disclosed a new route of how to repair defects in the palate, the pharynx, the oral cavity and the lips. The operations is well tolerated by the patient, and does not require as many stages and as long a treatment, as does, for instance, the employment of a tubed skin pedicle flap. The method has no doubt great perspectives which it is at present hard to predict to the full.

SUMMARY

A short history is presented of the repair of defects in the hard palate with tissues of the tongue. Unlike the method used hitherto, the author recommends to suture the pedicle of the flap formed on the back of the tongue into a tube, which has a number of advantages.

For immobilization of the tongue, mattress stitches led out in the region of the maxillary teeth, are used. Such operations were performed under intratracheal general anaesthesia in nine patients with residual defects in the palate from congenital cleft, and the result was good in each case.

RÉSUMÉ

La nouvelle méthode de couvrir le défaut du palais

G. V. Krutchinskiy

Une histoire bref est exposée touchant les méthodes de couvrir les défauts du palais dure par le tissu de la langue. Tout différement des modes connues l'auteur récommende de coudre la base nourritive du lambeau fait de la langue en forme du tuyau ce qui offre beaucoup de préférences.

Pour fixer la langue l'auteur se sert des suttures matelassées, qu'il fait sortir dans la région des dents de la mâchoire supérieure. Ces opérations faites sous l'anésthésie intratrachéale ont été entreprises chez 9 des malades aux défauts résiduels après la fente innée. Les résultats obtenus ont été très bien chez tous les malades.

ZUSAMMENFASSUNG

Über ein Neues Verfahren zur Deckung von Defekten im Gaumen

G. V. Krutschinskiy

Vorgelegt wird eine kurze Geschichte der Deckung von Defekten im harten Gaumen mit Zungengeweben. Im Gegenteil zu dem bekannten Verfahren empfiehlt der Autor, den Nährfuss des aus der Zunge ausgeschnittenen Lappens in die Form eines Röhrchens zusammenzunähen, womit eine Reihe von Vorteilen gewonnen wird.

Zur Fixierung der Zunge benutzt der Autor Matrazennähte, die er in der Gegend der Oberkieferzähne hinausführt. Derartige Operationen unter intratrachealer Narkose wurden bei 9 Kranken mit residualen Defekten nach angeborener Spalte vorgenommen. Die Ergebnisse waren bei allen Kranken gut.

RESUMEN

Sobre un nuevo modo de la cobertura de los defectos en el paladar

G. V. Kruchinskiy

Es presentada una historia corta de la cobertura de los defectos en el paladar duro por los tejidos de la lengua. A diferencia del modo conocido recomienda el autor recoser la pata sustentante del lóbulo recortado de la lengua en la forma de un tubo, lo que tiene una serie de ventajas.

Para la fijación de la lengua emplea el autor los hilvánes de colchón, los que hace salir en la zona de los dientes de la mandíbula superior. Tales operaciones en la narcosis intratraqueal se realizaron en nueve enfermos con los defectos residuales después de la grieta congénita. Los resultados fueron buenos en todos los pacientes.

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G. V. Kruchinskyi, ul. Podlesnaya 3, Minsk 44, USSR

9° Cours International de chirurgie de la Main du Docteur Marc Iselin

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Le Cours se compose de: 12 leçons théoriques, 3 séances de présentation de malades, 2 séances opératoires télévissées, 3 séances de démonstration de technique, 1 forum de clôture.

Le repas de midi est pris en commun à l'Hôpital.

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University Hospital, Zürich (Switzerland)
Second Surgical Clinic
Plastic Surgery Section

THIN AND THICK PEDICLE FLAP

L. CLODIUS, J. ŠMAHEL

A single-pedicle flap, when raised, is nourished only through its pedicle. Gradually, the blood supply from the wound bed (edges and undersurface) takes over. This process is clinically well established. However, until this is acomplished, there exists a critical phase concerning the viability of the flap.

From the clinical point of view, the question arises, whether a thick or a thin single-pedicle flap survives best this critical period.

In an attempt to answer this question, the following experiments were performed.

MATERIALS AND METHODS

22 female pigs, weighing 35 to 50 kilos, were used. Preanaesthetic medication consisted of 4 mgm per kilo Phencyclidine (Parkesernyl, Parke Davis) i. m. Approximately 10 minutes later, following assumption of lateral recumbency, the animals were generally anaesthetised with fluothane, using a face mask. All experimental procedures were performed under sterile conditions.

In a series of pilot experiments with thick flaps, various sizes and locations of single-pedicle flaps were tested to standardise the experimental model. In the definitive arrangement the flaps were raised so as to avoid larger vessels supplying them (Fig. 1). This corresponds to the situation most frequently encountered (1). The size of the flaps was selected to result in a necrosis comprising aproximately 50 % of their length.

For definitive experiments, 13 animals were chosen. Four dorsally based single-pedicle flaps were raised on each side of the thorax and abdomen, each flap measuring 4×14 cm. The distance separating the flaps was 3 cm in smaller, 4 cm in heavier animals. Two kinds of flaps were used, designated thin or thick. On the same side of the animal, the flaps were kept of the same thickness. The thin flaps consisted, as in clinical practice, of the whole skin with a thin layer of subcutaneous tissue. The average thickness of a thin flap being then 3 to 4 mm (Fig. 2). The thick flaps were raised from the deep fascia, covering the muscles of the chest and abdomen. They consisted of skin and the whole subcutaneous layer, the average thickness was 10 to 12 mm. Haemostasis having been secured, the flaps were returned to their beds and

sutured into position. Half of all of the thick and thin flaps were separated from the wound-bed and its edges by a sheet of nonporous cellophane (Saranwrap) (Fig. 2). Four groups, representing a total of 104 flaps were thus obtained:

1. 24 thick flaps in direct contact with their wound bed
2. 28 thick flaps separated from their wound-bed by Saranwrap
3. 28 thin flaps in direct contact with their wound-bed
4. 24 thin flaps separated from their wound-bed by Saranwrap.

At the end of the operation, the operative field was covered with a light gauze dressing, which was kept in position by a carefully applied, non compressing elastic tape. This was well tolerated and not soiled by the female pigs.

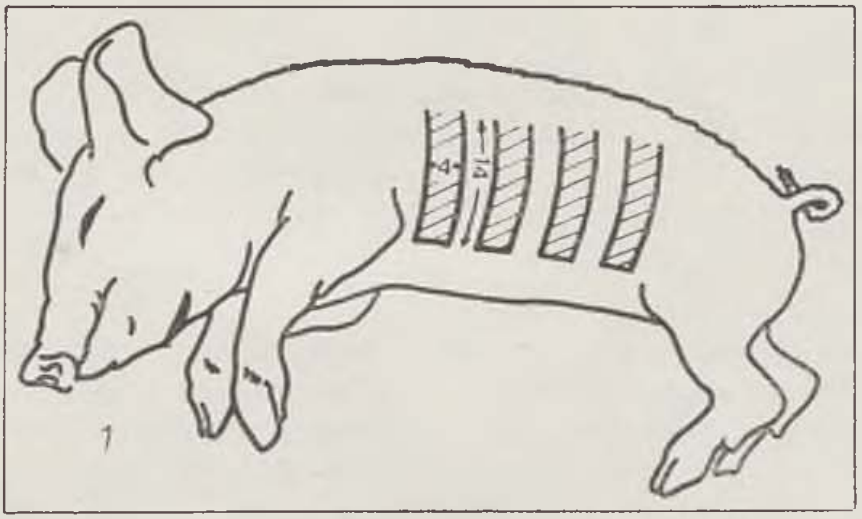


Fig. 1. Design and location of flaps.

Dressings were changed within the range of 5 to 21 days, until the extent of flap survival became obvious. Color and black and white fotographs were made following each operative procedure and/or dressing change. The exact evaluation and measurement of the length of the surviving portion of a flap was performed on a graduated screen, the color slides having been so projected as to correspond to a flap size of 100 cm.

RESULTS

Postoperative complications did not occur and all dressings remained in position during the period between bandage changes.

On clinical inspection of the flaps, their behaviour within a group remained quite uniform, while between the groups there existed distinct differences. These similarities and differences may be summarized as follows:

Group 1. Thick flaps in direct contact with their wound-bed. After initial raising of the flaps, their distal half became cyanotic. 5—7 days post-operatively, an obvious difference between the surviving and necrotising part of the

flap could be seen (Fig. 3) After 14 days the demarcation became sharp. Measurement revealed the survival of ½ of the flaps, measured along their length, just as was seen in the pilot experiments. More precisely stated, 53 % of the tissue remained viable in these flaps.

Group 2. Thick flaps, separated from their wound-bed. The clinical course and results obtained with these flaps were similar to those seen in group 1. (Fig. 4). Within 10 to 14 days the distal half of the flaps had become necrotic and sharply demarcated. Measurements after demarcation showed 55.7 % average survival.

Group 3. Thin flaps in direct contact with their wound-bed. After initial elevation, cyanosis was noted in the distal ¾ of the flaps. During the next weeks, the cyanotic area gradually regained its normal colour except for some patchy areas of desquamation and necrosis (Fig. 5, Fig. 6). Measurements after complete healing, three weeks post op., revealed 79.9 % average survival for the group.

Group 4. Thin flaps, separated from their wound-bed. After raising the flaps, cyanosis occured to the same extent as it had in group 3. After 5—7 days however, the distal ¾ of the flaps were necrotic (Fig. 7). Measurements after demarcation showed the flaps to have survived to the extent of 26.5 %.

DISCUSSION

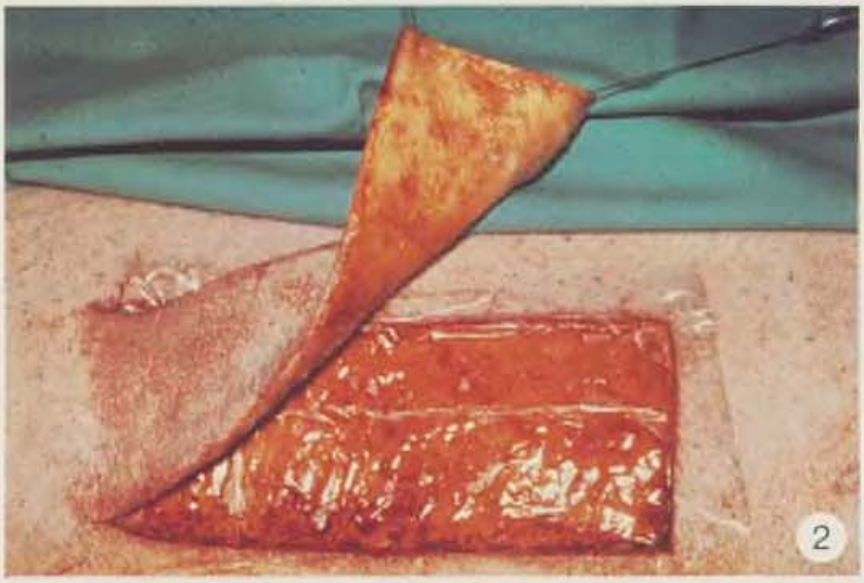
Pigs were chosen as experimental animals, because their skin resembles that of man in histology and angio-architecture (1, 2). Looking for a suitable experimental model for testing the full surviving capacity of a single-pedicle flap, we realised, that using flaps with a sufficient broad pedicle as in clinical practice, we would not detect the clear differences needed to reach the conclusions sought. Therefore, in the pilot experiments (thick flaps in direct contact with their wound-bed), the length of the flaps in relation to their width was determined in order to obtain necrosis of aproximately ½ of the flaps. A baseline was thus established to test

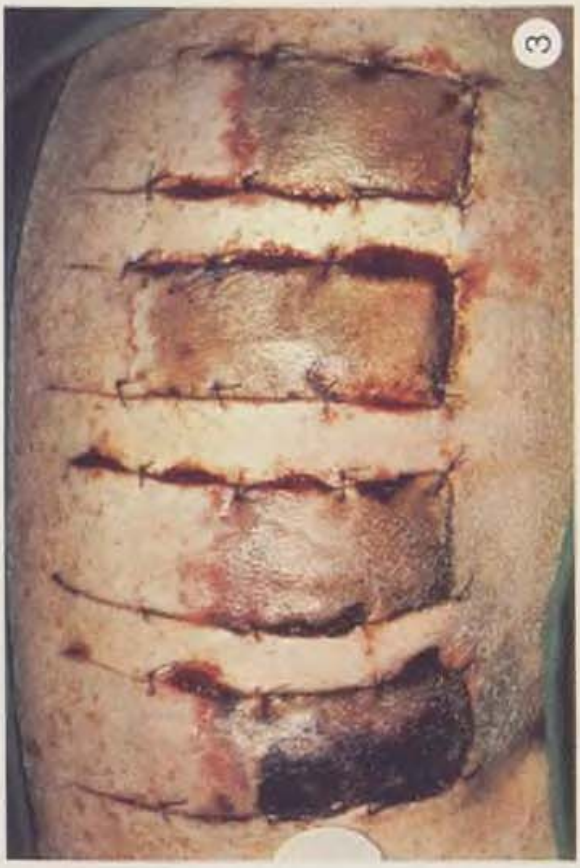
a) the behaviour of thin flaps under same conditions and
b) the influence of separation between flap and wound-bed in both thin and thick flaps.

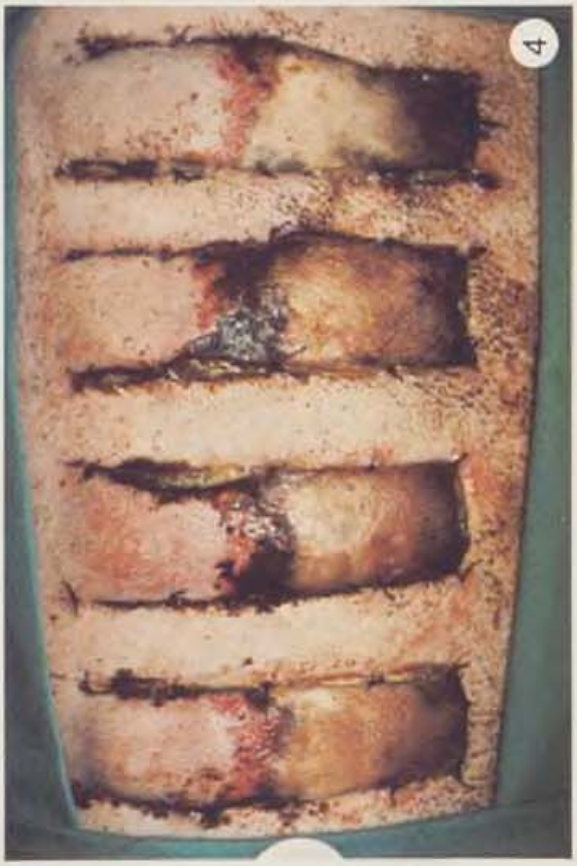
The Saranwrap was placed underneath the flaps for the following reason: The flap is at first nourished by the blood supply through its pedicle. In the course of healing, anastomoses develop between wound-bed and flap, and become increasingly important for its nourishment. Excluding this possibility through the Saranwrap blockade, the flap survival is left to its pedicle. In this way the importance of the wound-bed for the survival of the thick and thin flap may be determined. Experiments with thick flaps (group 1, 2) demonstrated, that exclusion of direct contact between the flap and its bed did not influence the extent of necrosis. This is in accordance with the findings of Meyers (3). A possible explanation would be: In the thick flaps the main vascular system remains intact and blook supply through the pedicle remains effective. Furthermore, in thick flaps the vascularisation arising from the

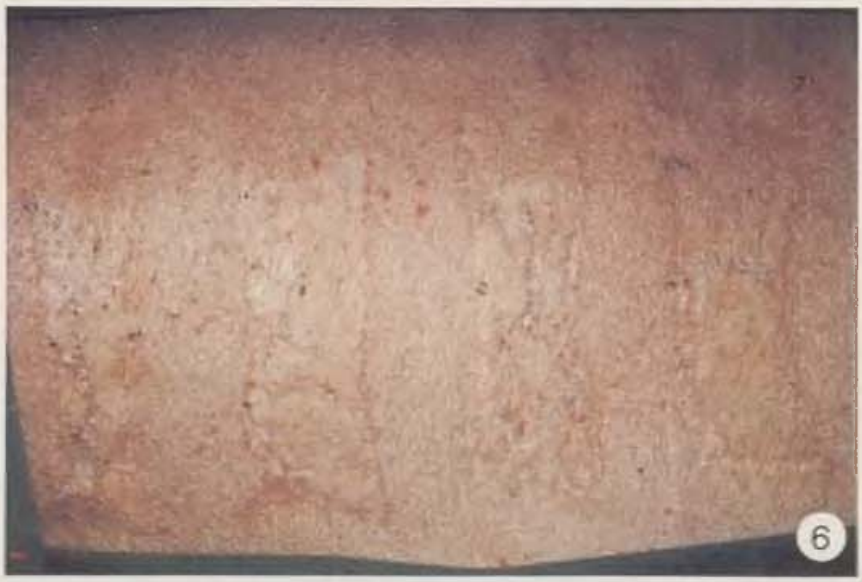
L. CLODIUS, J. ŠMAHEL

THIN AND THICK PEDICLE FLAP









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wound-bed remains a longer time insufficient due to the greater amount of biological material to be nourished. This corresponds with clinical experiences with composite grafts.

Experiments with thin flaps (group 3, 4) revealed, that direct contact with the wound-bed plays an important role. This is in contrast to the findings in thick flaps. 4/5 of the thin flaps, not separated from their wound-bed, survived. This was due to the activity of the wound-bed. When separated from the wound-bed by Saranwrap, only one quater of these flaps survived. It may be concluded, that the nourishment from the pedicle of a thin flap is relatively less important than the nourishment from the wound-bed. This view is supported by the fact, that the thick pedicle saved one half of the thick flaps, while the thin pedicle alone saved only one quarter of the thin flaps. A possible explanation is as follows: Thin flaps consist of skin and a thin layer of subcutaneous tissue. The vascular system of such a flap is not so complete and independant as is the case in thick flaps and the subcutaneuos vascular plexus may be damaged during the elevation procedure. Because of the smaller amount of biological material to be supplied, bloodvessel-anastomoses from the wound-bed to the thin flap are sooner adequate for its nourishment.

We are well aware of the fact, that the problems of nourishment of a single pedicle flap are complex (4—11). We realise, that the proportions of the model and the use of Saranwrap do not correspond directly to the clinical practice, where no absolute blockade between flap and wound-bed exists. Nevertheless, the following clinical conclusions may be drawn:

1. Thick flaps are well nourished through their pedicle. Therefore, they are preferred to cover a poorly vascularised wound-bed.

2. The survival of thin flaps depends greatly upon the vascular potentials of their recipient bed. Therefore, they will survive only with difficulty on poorly vascularised areas.

3. These two points should be considered, when in clinical practice, for the benefit of the overall contour, a flap needs to be thinned or tailored to a given defect (12, 13).

The different behaviour of thin and thick single-pedicle flaps leeds to questions concerning the suitability of their delay. These will be discussed in a further report.

SUMMARY

Two factors, influencing the survival of a single-pedicle flap: its thickness and the effects of its recipient bed, have been analysed experimentally and conclusions drawn.

RÉSUMÉ

Le lambeau cutané maigre et gras

L. Clodius, J. Šmahel

Dans l'expériment fait sur l'animal les auteurs ont étudié les influences de la masse du lambeau et de son lit l'égard du bon résultat de la plastie et quelques-uns des règles pour le praxis ont été donnée.

ZUSAMMENFASSUNG

Dünner und dicker Hautlappen

L. Clodius, J. Šmahel

Im Tierversuch untersuchten die Autoren den Einfluss der Dicke des Lappens und der aufnehmenden Stelle auf den Erfolg der Lappenplastik und zogen aus den Ergebnissen einige Schlüsse für die Praxis.

RESUMEN

Lóbulo de piel delgado y robusto

L. Clodius, J. Šmahel

En el experimento en un animal fue estudiada la influencia de la fuerza del lóbulo y la del lugar de recibo al éxito de la plástica de lóbulo y fueron hechas algunas conclusiones para la práctica.

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Dr. med. L. Clodius, Plastische Chirurgie, Kantonsspital, 8006 Zürich, Switzerland

Legend for colour illustrations

Fig. 2. A thin single-pedicle flap elevated. The wound bed is blocked by Saranwrap. — Fig. 3. Thick single-pedicle flaps, in direct contact with their wound-bed. One week post op. — Fig. 4. Thick single-pedicle flaps, separated from their wound-bed by Saranwrap. One week post op. — Fig. 5. Thin single-pedicle flaps, in direct contact with their wound-bed. One week post op. — Fig. 6. The same flaps as in Fig. 5, three weeks post op. — Fig. 7. Thin single-pedicle flaps, separated from their wound-bed by Saranwrap. One week post op.

Acknowledgement

We like to acknowledge the help of Prof. K. Amman and Dr. B. Fackelmann and the Veterinary Surgical Clinic of the University of Zurich in the total care of the animals.

The prints of colour illustration were supplied by the authors.

Charles University, Faculty of Medicine, Clinic of Orthopaedics, Hradec Králové
(Czechoslovakia)
Deputy Head Ass. Prof. J. Emr, M. D., CSc.
Institute of Pathologic Anatomy,
Head Prof. V. Vortel, M. D., DrSc.

TRANSPLANTATION OF HOMOGENOUS JOINTS

Treatment of homogenous osteocartilaginous graft by washing, x-ray irradiation and impregnation of cancellous bone with autogenous red marrow

O. FIALA, V. HEROUT

In the homotransplantation of the whole joint or its part the result depends not only on the technique of operation, on the codition and age of the recipient, on the condition and age of the donor and on the function of the graft, but also upon maintaining of biologic activity and upon the decreased antigenicity of the graft. The treatment of the graft should translate the two latter principles into reality.

When treating the homogenous osteocartilaginous graft, we must bear both graft components in mind. It has been proved experimentally and clinically that lyophilization and freezing are the most methods of preserving bone tissue (Heipe et al. 1963, Burwell 1966, Janeček, Horn 1962, Klen 1965, Imamaliev 1964, Katerinič 1966, Krupko et al. 1967, Spence et al. 1969). If these methods are applied, the specimens may be preserved for a long time. On the other hand the effect of low temperatures upon cartilage causes the chondrocytes to become necrotic in spite of being protected by glycerol (Gibson 1958, 1965) or dimethylsulphoxide (Chesterman, Smith 1968). The maintaining of the vitality of cartilaginous cells is also influenced by the period of graft storage (Klen et al. 1959, Hagerty et al. 1960, DePalma et al. 1963).

We also ascertained that articular cartilage is very well stored in liquid paraffin at +4 °C, the optimal period of storage being 7—14 days with an expirium of 30 days (Klen et al. 1959, Fiala et al. 1959). Under these conditions the most suitable treatment of the bone component is the forming of the composite auto-homograft (Fiala, Herout 1965, Fiala, Bartoš in print). In the endeavour to achieve still more favourable conditions for reconstruction of the

Technical cooperation J. Holečková

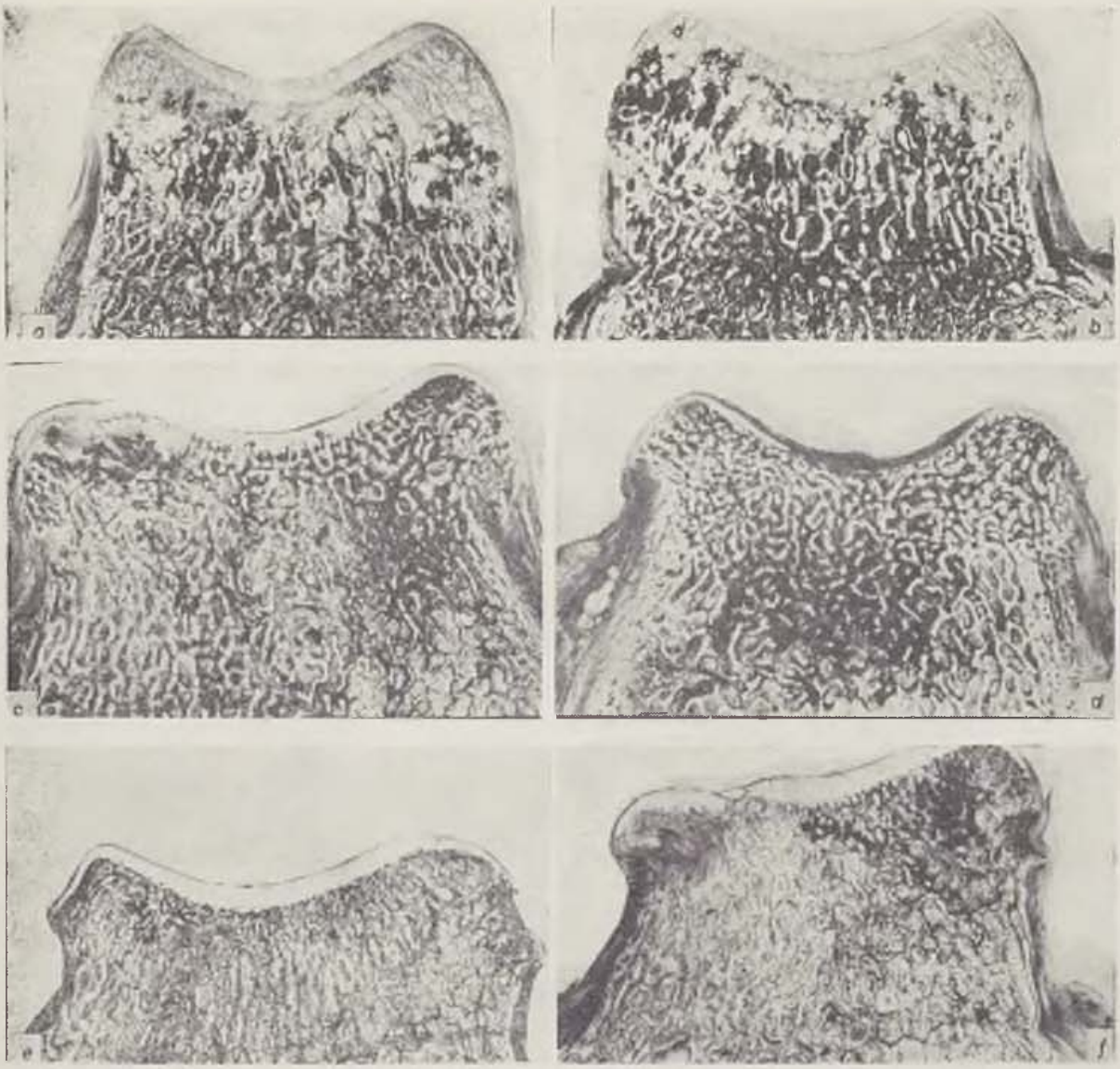
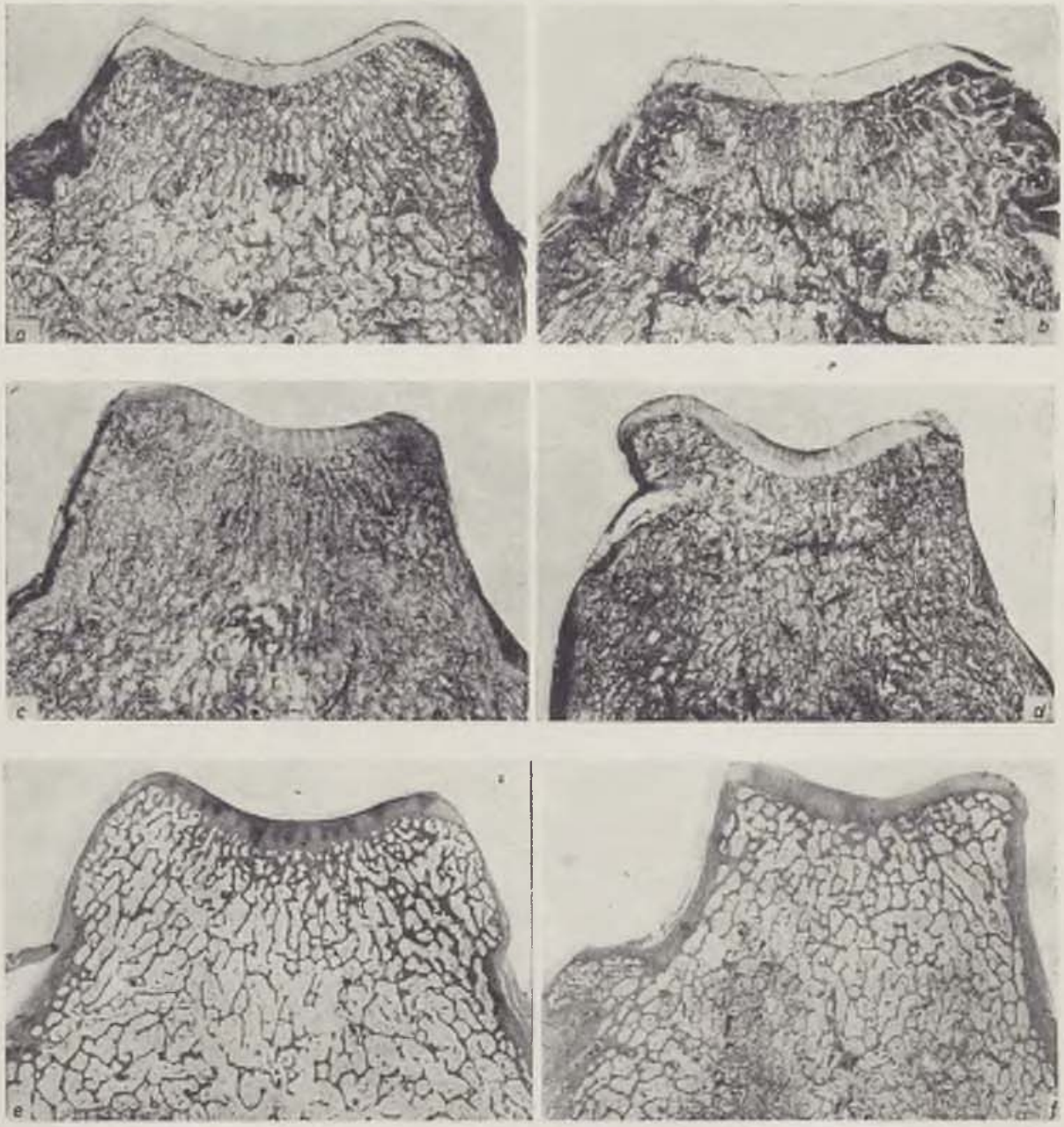


Fig. 1. The vascularisation and reconstruction of autogenous and treated homogenous grafts (in the left column autografts, in the right column homografts, the dark contents of the medullar spaces mark the vessels filled with Indian ink). — a) 2/68 A. Autogenous graft 4 weeks after grafting. Practically the entire graft shows good vascularity, the vessel system shows the original structure of the graft. Maximal vascularity is at the base of the graft. — b) 2/68 H. Homogenous graft 4 weeks after grafting. The finding corresponds to the autogenous graft. — c) 3/68 A. The autogenous graft 6 weeks after grafting. The structure of the base of the graft is the same as the structure of the bed. Left convexity slightly deformed. Due to the presence of fibrous tissue the vessels under the cartilage are not visible on this side. — d) 3/68 H. Homogenous graft 6 weeks after grafting. The condition is better than in the autogenous graft. — e) 5/68 A. Autogenous graft 3 months after grafting. The articular surface is undamaged, the cartilage adequately high, light deformation of the lateral parts of the graft. Structure of the graft is identical with the structure of the bed. — f) 5/68 H. Homogenous graft 3 months after grafting. Deformation of left convexity, continuity of the articular cartilage is disturbed in this place. On lateral side of the convexity a large focus of fibrous tissue (Slices 300 μ thickness, unstained, X4).

bone component of the osteocartilaginous graft without damaging the vitality of the chondrocytes, we irradiated the graft in addition by x-rays. In this paper we intend to report on the results of these experiments.

METHODS

In 12 mongrel dogs, mean weight 12 kg, we grafted the anterior part of the distal femoral bone end. The animals used in the experiment were of different sex and not older than 5 years. A homogenous graft was transplanted into the right knee and an autogenous graft into the left knee. The cancellous bone of the homogenous graft was washed in saline solution, then the graft was placed into a sterile glass and irradiated in this environment by 600 R. After 7—14 days storage in liquid paraffin at +4 ^{0}C, the graft was washed in



saline solution and left in a solution of antibiotics for ½ to 1 hour. Before grafting the cancellous bone was again washed in saline solution and impregnated with autogenous marrow, procured from the distal end of the femoral shaft in the experimental animal. The graft was fixed to the bed by a wire loop. The graft removed from the right knee was implanted into the prepared bed in the left knee and fixed by one wire loop. The joints were not immobilized. The animals were clinically and roentgenologically studied since the third day for 21 months after grafting. Before killing the dog the vascular system on both lower extremities was impregnated with a mixture of Indian ink and gelatine. After opening the knee joint we evaluated the macroscopic condition of the graft. We removed the graft with the bed and fixated it in 4% neutral formaldehyde. We left part of the specimen to be processed to thick slices in order to evaluate the vascularization and we processed the other part by normal histologic technique and stained it with haematoxylin-eosin.

RESULTS

1. Macroscopic appearance and vascularisation of the grafts:

After opening the joints we usually found no significant changes on the grafts by the end of the second month after grafting. All unevennesses formed in the place of attachment of the graft to the bed due to different size of the graft and the bed, were straightened out by the fibrous pannus. Early in the third month after grafting we observed at first smaller, later larger lesions of the lateral sides of the grafts, less frequently articulating joint surfaces. These changes affected both the homogenous and the autogenous grafts. The intensity of the changes was a little greater in homogenous grafts, especially on their lateral sides. The predominant majority of auto- and homogenous grafts maintained their original shape, their convexity was only decreased in single cases.

Fig. 2. Vascularisation and reconstruction of autogenous and homogenous grafts. — a) 7/68 A. Autogenous graft 9 months after grafting. Structure of the cancellous bone regular, articular cartilage adequately high, light deformation of lateral parts of graft (plastic type of pannus). — b) 7/68 H. Homogenous graft 9 months after grafting. Structure of spongiosa not as regular as in autograft. Light deformation below right convexity caused by lytic form of pannus. Plastic pannus on left side. Articular cartilage is adequately high. — c) 8/68 A. Autogenous graft 13 months after grafting. Structure of cancellous bone fine, regular, tiny connective tissue focus under the cartilage of the left convexity. Articular cartilage adequately high. — d) 8/68 H. Homogenous graft 13 months after grafting. Structure of cancellous bone regular, left side deformed by lytic pannus. Articular cartilage adequately high. — e) 9/68 A. Autogenous graft 21 months after grafting (vessels without Indian ink). Structure of cancellous bone fine, regular, articular cartilage adequately high, shape of graft well maintained. — f) 9/68 H. Homogenous graft 21 months after grafting (vessels without Indian ink). Small deformation of left lateral part of graft, structure of cancellous bone fine, articular cartilage adequately high (a—d slices 300 μ thickness, unstained, e—f slices 8 μ thickness, stained with haematoxylin-eosin, X4).

When studying the vascularisation of the grafts we ascertained blood vessels in the base in the first week, after 14 days in the basal half of the grafts and in the fourth week practically the whole graft was vascularised. We found no difference in vascularisation between the homogenous- and the autogenous graft. The initial great vascularisation of the base of the graft and the bed receded towards the fourth week after grafting. By the fourth month after operation the line of the grafting was not visible any more. From the fifth month onwards we found increased vascularization only in those places where the graft was deformed or the cartilage damaged (Fig. 1, 2).

2. Reconstruction of the grafts

In the first week after transplantation we ascertained a space between the graft and the bed filled up by a fibrin network with numerous erythrocytes, leucocytes and bone fragments. At the end of the first week the graft and the bed were connected by young granulation tissue, in which young bone trabeculae could be distinguished. In the basal medullary spaces of the grafts we found the same picture. Some trabeculae of the graft facing the bed were resorbed by osteoclasts. At this time there was no difference between the findings in autogenous and homogenous graft.

In the second week after grafting the granulation tissue pervaded the basal half of the cancellous bone in both types of grafts. The graft trabeculae were resorbed in this region whereas in the medullar spaces new young trabeculae formed. In some places — rather in homogenous grafts — we found lymphocytes and larger cells of macrophage type. We found no significant differences between the auto- and homogenous grafts. The articular cartilage was adequately high without signs of necrosis.

Four weeks after grafting the cancellous bone of both types of graft was pervaded by granulation tissue in its entire height. The process of maximal modelling could be ascertained in the basal half of the grafts. At that time

Fig. 3. a) 10/68 H. Homogenous graft four weeks after grafting. Right convexity and part of second convexity separated by fibrous tissue stripe. Medullar spaces above fibrous tissue, empty. — b) 12/68 H. Autogenous graft 9 months after grafting. Large focus of fibrous tissue under left convexity. The cartilage above the focus separated (Slices 8 μ thickness, stained by haematoxylin-eosin, ×4).

there formed already in some grafts — usually under one convexity — tiny foci or a stripe of connective tissue which separated the upper part of the convexity from the rest of the graft. In this separated part the medullar spaces remained empty without granulation tissue and without the process of reconstruction (Fig. 3a). The tendency to form such islets or stripes composed of fibrous tissue, typical spindle-shaped fibroblasts and not too numerous histo-

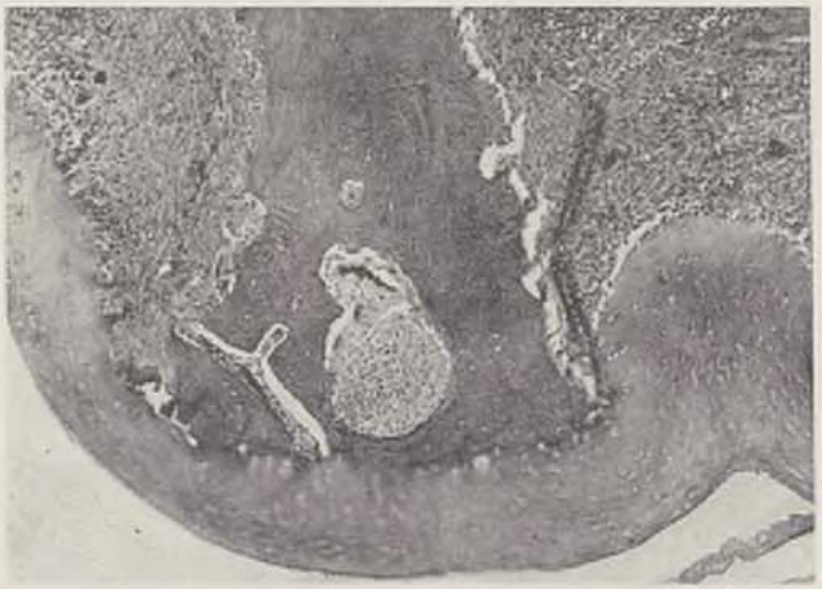


Fig. 4. 8/68 H. Lateral part of convexity in homogenous graft 13 months after transplantation. In center of figure bone trabeculae surrounded by fibrous tissue being disintegrated. Cartilage necrotic, inaccurately demarcated, undergoing process of resorption (stained by haematoxylin-eosin, ×40).

cytic cells, was greater in homogenous grafts. At the end of the second month after grafting the junction between the bed and the graft was difficult to distinguish and the reconstruction of the bone tissue was most intensive in the upper half of the grafts.

During the period of 10 weeks up to 4 months, we observed that the basal medullar spaces of the autogenous and homogenous grafts are filled up with fatty tissue with not too numerous vessels filled with Indian ink. We were able to observe this arrangement of spongiosa up to the height of the graft concavity. In the graft convexities we found in several places tiny foci of fibrous tissue, in homogenous grafts these foci were greater. When the foci were large and subchondreally situated the cartilage of the graft got usually broken and the convexity deformed (Fig. 1 f).

In the further course of the experiments (up to 21 months after grafting) the shape of the graft remained usually maintained. The most frequent deformation occured at its side and predominantly in homogenous grafts. In these places the cartilage underwent degenerative changes. Its height decreased, the accurate demarcation from the subchondral bone was disappearing and

the amount of chondrocytes decreased (Fig. 4). The cartilage of the articulating surface remained however adequately high and its vitality was good or very good (Fig. 5).

DISCUSSION

Decreased antigenicity of the cancellous bone graft by washing the medullar spaces, was proved by Burwell in his experiments in mice (1963 a, b). He found that fresh homologous marrow-free iliac bone inserted into the drainage areas of lymph nodes previously sensitised to donor tissue does not

Fig. 5. 9/68 H. Cartilage of the homogenous graft concavity 21 months after transplantation. Basal 2/3 show a relatively large number of chondrocytes and good demarcation from the subchondral bone (stained by haematoxylin-eosin, X150).

produce detectable evidence of a secondary response. But he ascertained simultaneously that the cancellous marrow-free bone only forms a very small amount of new bone. By impregnation of the washed homogenous cancellous bone with autogenous marrow Burwell (1964) formed a composed auto-homograft which manifested considerable bone formation and did not induce transplantation immunity.

In our experiments (Fiala, Herout 1965) we formed a combined auto-homograft by drilling-off part of the homogenous cancellous bone, replacing it for the same autogenous tissue. The reconstruction of this graft was more perfect and approached the reconstruction of the autogenous graft. The application of Burwell's methods in grafting part of the articular surface (Fiala, Bartoš in print) also improved the reconstruction of the bone component of the homogenous graft and prevented disintegration and larger deformations of the graft. We were aware however that by washing the cancellous bone we remove practically all free elements from the medullar spaces but not their lining which together with the other factors will be of unfavourable effect (by its

antigenic properties) upon the pervasion of granulation tissue from the bed and upon reconstruction of the homogenous bone. For this reason we endeavoured to decrease the antigenicity of the graft by 600 R irradiation after washing the cancellous bone before preservation.

We were initiated by the experimental reports (Heiple et al. 1963, Burwell 1966, Kosinka et al. 1965, 1967) in which the take of differently prepared homogenous bone grafts was compared and improved remodelling in comparison to fresh homogenous graft was ascertained in irradiated grafts. The clinical evaluation of the take of irradiated bone grafts after grafting in patients was also favourable (Marmor 1964).

We were aware on the other hand that higher x-ray dose may be of unfavourable effect upon articular cartilage. Sarnat and Laskin (1954) cite in their extensive report the observations by Bar and Gall who ascertained after irradiation changes on the epiphyseal cartilage but not on the articular cartilage Reidy on the other hand found after irradiation of articular cartilage light or medium degenerative changes which he rather considered to be changes from disturbed joint function than the sequel to irradiation. It results from our experiments that the 600 R dose was not of unfavourable effect upon the articular cartilage of the graft because even 23 months after grafting the cartilage manifested good vitality (Fig. 5).

When studying the recontruction and the final shape of the irradiated auto-homografts we ascertained usually light graft deformation. Most frequently this deformation affected the side of the graft, less frequently one convexity. The lateral deformation was caused by the plastic or lytic form of the pannus (Fiala, Bartoš in print); it was smaller in autogenous grafts. Deformation of the convexity was formed due to imperfect reconstruction of cancellous bone in the subcartilaginous areas of the convexity. The islets or stripes of fibrous tissue forming in the cancellous bone, prevented further reconstruction of the graft and were the cause of its deformation. The formation of fibrous tissue and resorption of bone trabeculae is not characteristical for the reconstruction of homogenous bone tissue alone. It may be also found in the process of remodelling of autogenous grafts (Fig. 1 c, 3 b). It results from this that the formation of fibrous tissue with subsequent resorption of the bone trabeculae is most probably the sequel to worsened conditions in the reconstruction of bone tissue (local ischaemia, early maturation of the granulation tissue).

When comparing the remodelling of the non-treated homogenous osteocartilaginous graft with the graft treated by washing, irradiation and impregnation with autogenous marrow, we find in the latter graft a more rapid ingrowing of granulation tissue from the bed, more perfect reconstruction of the bone and good vitality of the articular cartilage. The properties of the treated homogenous graft are therefore undoubtedly better than in the non-treated graft.

When comparing the reconstruction of the homogenous graft treated by washing and impregnation with autogenous marrow alone, with the same

graft treated by washing, irradiation and impregnation with autogenous marrow, we found no significant difference. In the graft treated by irradiation the ingrowing of granulation tissue from the bed seemed to be more rapid; but the reconstruction of the bone tissue and the final shape of the graft showed no significant differences.

SUMMARY

The authors studied the vascularisation, reconstruction and final shape of the grafted anterior articular surface of the distal end of the femur in 12 dogs from 14 days till 21 months after grafting. They compared the macroscopic and histologic findings in homogenous osteocartilaginous grafts prepared by washing the cancellous bone, x-ray irradiation and impregnation with autogenous marrow with the findings in autogenous grafts. They ascertained that the vascularisation in the treated homogenous graft was not delayed in comparison to the autogenous graft, the reconstruction of the bone component approached the reconstruction of the autogenous bone and the cartilage of the articular surface manifested vitality during the entire experiment. The treated graft never disintegrated, light deformation affected the side of the graft, exceptionally one convexity was affected.

RÉSUMÉ

La transplantation des joints homogènes. — La préparation du transplant ostéocartillagineux homogène par le lavage, par les rayons X et par l'imprégnement de la spongiose par la moelle autogène

O. Fiala, V. Herout

Les auteurs ont examiné la course sanguine, la transformation et la forme résultative de la partie antérieure articulative du bout distal du fémure chez douze chiens dans la période de quinze jous à vingt-un mois suivant la transplantation. Ils ont comparé les données macroscopiques et celles histologiques chez les transplant ostéocartillagineux homogènes préparés par le lavage de la spongiose, par les rayons X et par l'imprégnement par la moelle autogène avec les résultats des transplants antogènes. Il c'est trouvé que la course sanguine du transplant homogène équivait à celle autogène, la transformation de la partie osseuse était proche à celle de l'os autogène et le cartillage de la partie articulative du joint montrait la vitalitě au cours des expériments entiers. Jamais le transplant préparé n'a montré des marques de dégénération, seulement une legère déformation eut lieu sur la côte du transplant, tout exeptionellement une des convexités.

ZUSAMMENFASSUNG

Die Transplantation homogener Gelenke. — Bereitung des homogenen osteokartilaginösen Pfropfens durch Durchspülung, Röntgenbestrahlung und Impregnation der Spongiosa mit autogenem Mark

O. Fiala, V. Herout

Die Autoren untersuchten die Durchblutung, den Umbau und die resultierende Form der transplantierten vorderen Gelenkfläche des distalen Endes des Oberschenkels bei 12 Hunden nach 14 Tagen bis 21 Monaten nach der Übertragung. Sie verglichen die makroskopischen und histologischen Befunde bei homogenen osteokartilaginösen Pfropfen, die durch Spülung der Spongiosa, Röntgenbestrahlung und Impregnation mit autogenem Mark bereitet wurden, mit autogenen Pfropfen. Es wurde festgestellt, dass sich die Durchblutung des bereiteten homogenen Pfropfens nach dem autogenen Pfropfen nicht verspätet hat, der Umbau der Knochenkomponente näherte sich dem Umbau des autogenen Knochens und der Knorpel der artikulierenden Gelenkfläche erwies sich während des ganzen Versuchsverlaufs als lebensfähig. Nie ist es zum Verfall des bereiteten Pfropfens gekommen, eine leichte Deformität befiel die Seite des Pfropfens, ausnahmsweise eine Konvexität.

RESUMEN

Preparación del injerto osteocartilaginoso homogéneo por la irrigación, por la radioterapia y por la impregnación de la espongiositis con la médula autógena

O. Fiala, V. Herout

Los autores siguieron la circulación de la sangre, la reconstrucción y la forma final de la superficie anterior de articulación transplantada del extremo distante del hueso fémur en 12 perros desde 14 días hasta 21 meses después de la traslación. Comparaban los diagnósticos macroscópicos y histológicos en los injertos osteocartilaginosos homogéneos preparados por la irrigación de la espongiositis, por la radiación de rayos X y por la impregnación con el tuétano autógeno con los injertos autógenos. Comprobaron que le circulación de la sangre en el injerto homogéneo preparado no se atrasó tras del injerto autógeno, la reconstrucción del componente huesoso se aproximó a la reconstrucción del hueso autógeno y el cartílago de la superficie de articulación probaba la vitalidad en todo el transcurso del experimento. Nunca llegó al desmoronamiento del injerto preparado, la deformación ligera intervenía el lado del injerto, exceptionalmente una convexidad.

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Doc. Dr. O. Fiala, Ortoped. klinika, Hradec Králové, Czechoslovakia

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The Fourth International Congress of the Transplantation Society will be held in San Francisco, California U. S. A. from September 24—29, 1972. The headquarters for the meeting will be the San Francisco Hilton Hotel. At a later date you will receive information on registration, hotel facilities, submission of abstracts and other aspects of the Congress.

The Organizing Committee has planned a broad program in Transplantation Biology and medicine which will include:

1. plenary sessions in major areas of research and clinical transplantation; 2. scientific sessions in which new developments will be presented and 3. workshops for in-depth discussions of research, clinical and theoretical developments. Tumor Immunology, In Vitro Testing, Immunosuppression, Tolerance and Enhancement, Mediators of Cellular Immunity, Accomplishments in Clinical Transplantation and many other related topics will be featured.

Samuel L. Kountz, M.D., Chairman Local Organizing Committee Fourth International Congress Transplantation Society.

J. Komenský University, Medical Faculty, Dept. of Plastic Surgery,
Bratislava (Czechoslovakia)
Head Prof. Štefan Demjén M. D.

OUR METHOD OF REPAIRING THE „SHELL" EAR DEFORMITY

F. MARIŠ

In the deformation of the upper half of the pinna, called by the descriptive term "shell" ear deformity, the margin of the helix is not developed. The rim of the upper auricle is not protruding. Its thin edge resembles a clam shell. The depression between the rim of the auricle and crus superior antihelicis-scapha is missing. The upper half of the pinna is flat and the maldeveloped cartilage is thin.

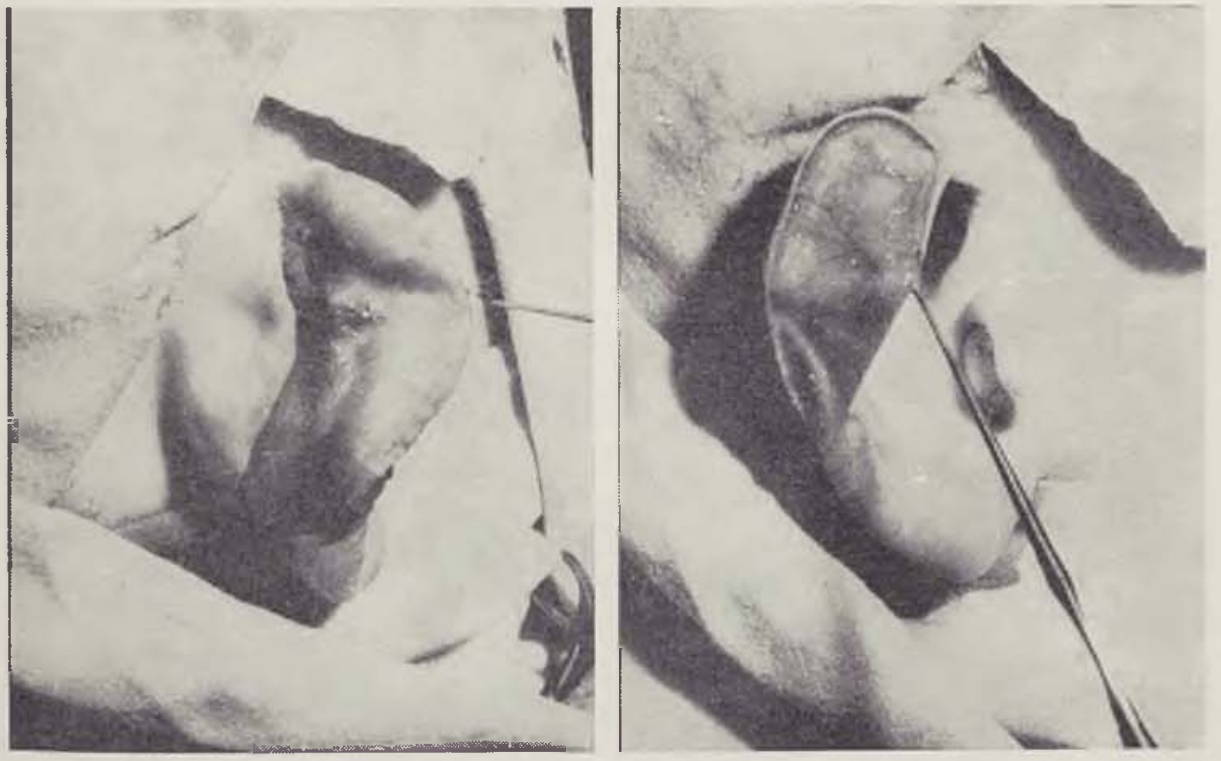


Fig. 1. The skin has been separated and the bare cartilage of the deformed auricle on the dorsal area may be seen. — Fig. 2. The front rim of the cartilage has been also partly loosened

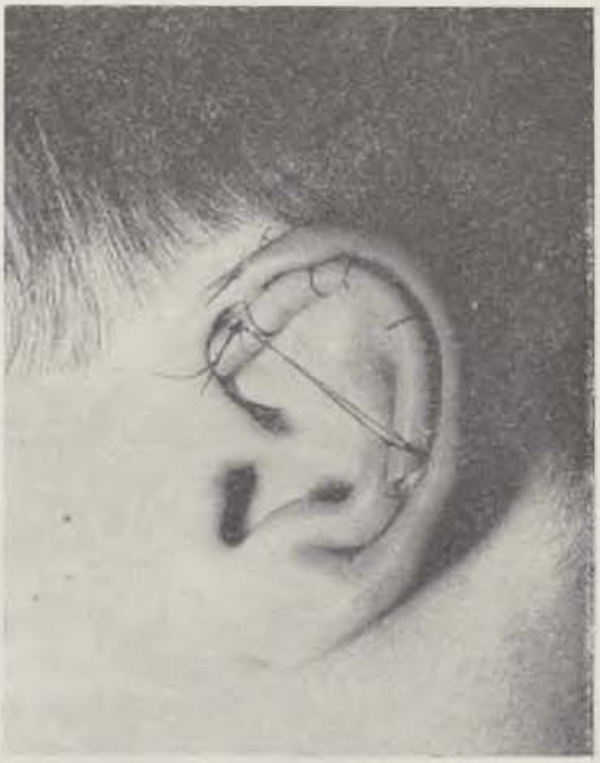
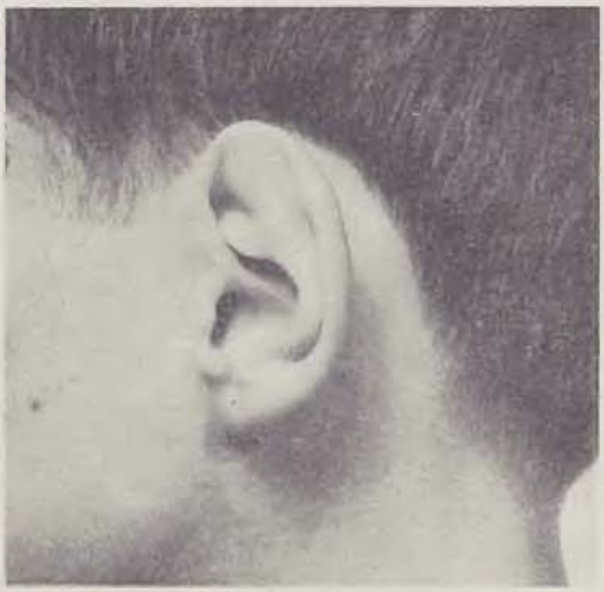


Fig. 3. Incision of the cartilage parallel to the margin of the helix. — Fig. 4 Depression of scapha and rounding off of the helix is carried out by mattress stitches around a rubber tube

The deformation affects the auricle mainly on its upper circumference and partly in the central third. In the distal part where the cartilage is not so much protruding forward and where it does not reinforce the helix up to the



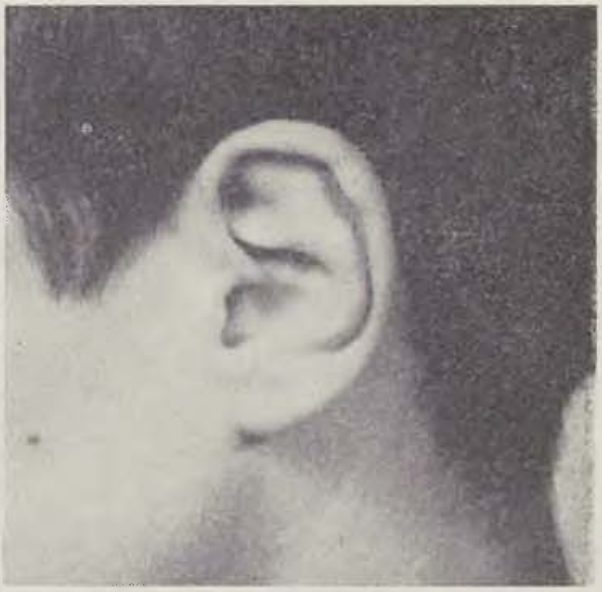


Fig. 5a. Absent margin of helixe on the left auricle in the upper segment in patient L. M. aged 14. — Fig. 5b. Condition ½ year after the operation.

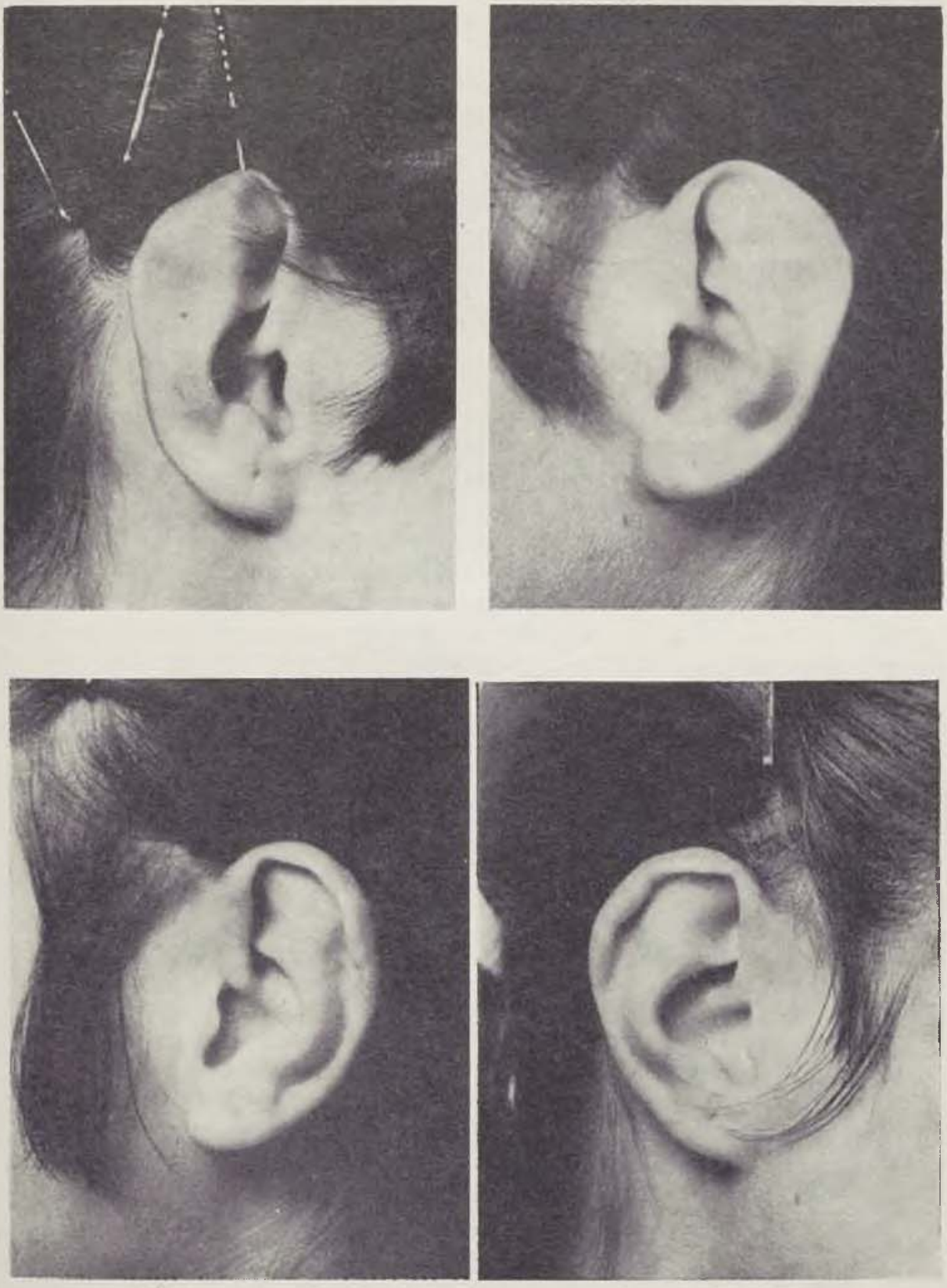


Fig. 6a. Shell-type auricles with absent margin of helix in patient E. M. 21 years old. Fig. 6b. After the operation and 5 weeks of fixation we achieved good forming of the auricles.

rim, the deformation is not so much apparent. The front relief of the other auricle is usually well configurated.

We should like to report on the method which we developed and which we are using when repairing the deformation in our patients.

We make an incision on the posterior surface of the auricle parallel to its rim at a distance of 1—1.5 cm. The length of the incision corresponds to the size of the helix deformation. Sometimes it affects the entire upper rim and the central third of the cartilage which we also loosen on the frontal area of the auricle at a width of 2—3 mm (Fig. 1, 2).

Parallel with the rim of the cartilage at distances of 1—2 mm we then make 3—5 incisions over the cartilage to the frontal perichondrium over the entire length of the absent helix (Fig. 3). Thus it already becomes spontaneously rounded off, the rim of the cartilage is pushed forward, the convexity of the helix is formed in dorsal direction and the scapha is deepened. In some patients we were obliged to make one or two incisions in the entire thickness of the cartilage and the perichondrium, so as to afford good rounding off. The incision on the cartilage must be carried out without angles, so that the rounding off proceeds smoothly in the area of the entire helix.

We place no stitches on the cartilage. We suture the skin with fine nylon. We place a rubber tube of corresponding diameter into the formed groove and fix the auricle rim in direction to the antihelix by mattress stitches so that the rim embraces the tube and thus forms a good rounding off of the helix (Fig. 4). This fixation with stitches we leave for 10—14 days. We then complete the modelling of the cartilage and helix with stripes of adhesive plaster. They maintain them in the desired position. We leave this fixation of the newly formed helix for 4—6 weeks after the operation.

We demonstrate the operational procedure and some of the results achieved by the mentioned mehod on the illustrations (Fig. 5a, 5b, 6a, 6b).

SUMMARY

The report on a method elaborated and used at the Dept. of Plastic Surgery, Medical Faculty, J. A. Komenský University in Bratislava for the repair of auricle deformation where the helix margin is absent. A longitudinal incision of the cartilage from the dorsal side after separating the skin, establishes conditions for rounding of the helix. Several weeks of fixation by modelling bandage afford by this method good formation of the helix and depression of the scapha. Figures illustrate the surgical procedure and some of the results achieved by this method.

RÉSUMÉ

Notre manière de réconstruction d'hélixe lisse de l'oreille déformée

F. Mariš

L'auteur décrit la méthode élaborée et employée à la clinique de la chirurgie plastique L F U K à Bratislava, servant de réconstruction de l'oreille déformée, dont l'hélixe manque sa partie ovale charactéristique. Par des incisions longitudinales de la

partie dorsale du cartillage, la préparation de la peau une fois accomplie, les conditions nécessaires pour la réconstruction de cette partie ovale sont faites. Par la fixation à l'aide du pansement modélé de durée de quelques semaines on obtient par cette méthode une bonne configuration d'hélixe de même que de la partie ovale. Des images servent à documenter les étapes opératoires de même que les résultats de la méthode respective.

ZUSAMMENFASSUNG

Unser Verfahren zur Korrektion der ausgeglätteten Helix der Ohrmuschel

F. Mariš

Berichtet wird über eine an der Klinik für plastische Chirurgie der ärztlichen Fakultät der Komenský Universität Bratislava erarbeitete and angewandte Methode zur Korrektion der Ohrmuscheldeformation, bei der sich die Abrundung der Helix nicht gebildet hat. Nach dem Abpräparieren der Haut werden durch längliche Inzision des Knorpels an der dorsalen Seite Bedingungen für die Bildung der Helixabrundung geschaffen. Durch mehrwöchige Fixierung mit einem Modellierungverband wird mit dieser Methode gute Gestaltung der Helix und Vertiefung der Scapha erzielt. Das Operationsverfahren und einige mit dieser Methode erzielten Ergebnisse werden mit Abbildungen dokumentiert.

RESUMEN

Nuestro modo de la forma de la helix alisada del pabellón de la oreja deformado

F. Mariš

Se indica el método elaborado y empleado en la Clínica de Anaplastia de la Facultad de Medicina de la Universidad de Komenský (LFUK) en Bratislava para la forma de la deformación del pabellón de la oreja, en la que no es formada la redondez de la helix. Por la cortadura longitudinal del cartílago de la parte dorsal después de la despreparación de la piel se forman las condiciones para la formación de la redondez de la helix. Por la fijación de algunas semanas con la venda de modelo se alcanza con el método mencionado una buena formación de la helix y el ahondamiento de la escafa. El proceso de operación y algunos resultados obtenidos por este método son documentados con algunos cuadros.

Doc. Dr. F. Mariš, Partizánska 2, Bratislava, Czechoslovakia

The Faculty Hospital, Košice (Czechoslovakia), Department of Plastic Surgery, Head A. Kipikaša, M. D., CSc.

THE SHARE OF HEREDITY IN THE FORMATION OF DUPUYTREN'S CONTRACTURE

A. KIPIKAŠA

The question of the etiology of Dupuytren's Contracture (further DC) has been systematically studied by different medical branches for more than a century. The actual cause of the disease has not been revealed however so far.

One of the theories on the etiology of DC which in line with all the other theories was neither definitely confirmed nor refuted, is the theory on the hereditary etiology of DC.

We have found a number of reports in literature which concern the hereditary and the familial investigation of DC. We collected the data by the indi-

Tab. 1: Table of Familial Incidence of Dupuytren's Contracture Complied from Data by the Individual Authors in Literature

Author	Number of DC cases	Recorded familial incidence	
		Number of cases	%
Ling	50	34	68
Skoog	50	22	44
Schröder	30	12	40
Schubert	10	4	40
Reimold	40	13	32
Stackebrandt	17	5	30
Kanavel	29	8	28
von der Porten	28	7	25
Scholz	70	16	23
Ross	36	8	21
Krogius	22	4	18
Hueston	159	27	16,9
Heim et al.	76	12	15,8
Weckesser	81	12	15
Early	492 men		14,8
Early	103 women		12,6
Kipikaša	124	15	12
Reissmann	21	2	9
Maurer	200	12	6
Beck	602	15	2,5

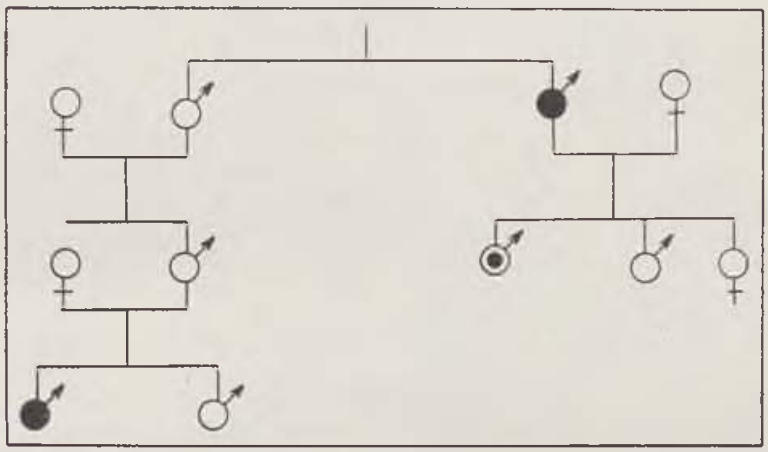
Tab. 2: Diseases occuring in Connection with Dupuytren's Contracture and their Relation to the Mesenchyme

Organs of the human body of mesodermal (mesenchymal) origin	Health conditions occuring in connection with DC
1. Blood vessels and lymphatic vessels	M. Bürger, atherosclerosis, hypertonia
2. Connective tissue (including connective apparature of liver, lung, spleen, kidney)	Rheumatism, cirrhosis, lung fibrosis, nephrosis, chronic bronchitis, lupus erytematodes dissem,
3. Cartilage	Osteoarthrosis, spondylarthrosis
4. Muscles (striped and unstriped, excepting m. dil. pupillae)	Rheumatism
5. Flat and long bones	M. Bechterev, osteoarthrosis, spondylosis, Rheumatism
6. Red and white blood corpuscles	Imunologic reaction by organism, rheumatism, LE
7. Heart	Infarction of the myocard, myocarditis, cardiosclerosis
8. Kidney parenchyma	Nefritis, m. hypertonicus
9. Thymus tissue	Immunologic reaction by organism
10. Crust of suprarenal glands	Activity secondarily influenced due to diseases of organism (adaptation of organism, stress, glucocorticoids and androgens in immunology)
11. Ovarium	Climacterium — increased DC in older women, adnexitis atrofia uteris
12. Testes	Climacterium — increased DC in older men
13. Uterus and vagina	Serious disorders of menstruation cycle; atrophy of uterus

vidual authors and compiled a table on familial incidence (Tab. 1). Crouch (1938) studied DC in two male enzygotic twins. DC formed in them at the same age and developped into the same type and degree. Both afflicted persons were farmers who thus not only had the same hereditary basis, they were also under the influence of the same external environment. Graubard (1954) ascertained in all patients with DC the RH+ factor and he assumes therefore that heredity is of dominating character.

Jolicoeur et al. (1962) are however justified when they object claiming that the RH+ factor is in approx. 85 % of the population and that they had ascertained in patient with DC the RH— factor in the same number as in healthy persons. They do not consider the data by Graubard to be decisive. Skoog (1967) assumes that the DC praedisposition factor is being inherited according to the Mendelian theory with incomplete penetration. Krogius

(1921) author of the atavistic theory on the DC formation assumes that DC forms from the persisting muscles flexores superficiales breves which submit to tendon degeneration. He states the analogy with torticollis. Further authors too are in favour of this theory. Recently this theory was revised and supplemented by Stein, Wang et al. (1960). According to these autors rudimentary hypoplastic muscle fibers of the primitive muscle in palmar aponeurosis are inherited at a certain percentage recessively.



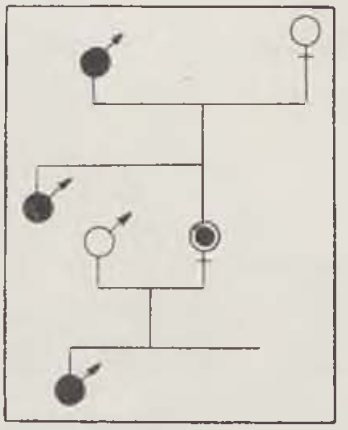
Genealogic scheme 1. G. O., born 1922, case history Nr 1263. — Case history: Suffers of stomach ulcer, gallstones, has feelings of anxiety without evident reason. — Family case history: Father operated on for stomach ulcer 25 years ago in the USA. Mother died of cancer of the breast at the age of 65. — Duration of the disease: left hand: since 1965 right hand — Incidence of DC in the family

OUR OBSERVATIONS

When making a complex research on the etiopathogenesis of DC we paid detailed attention to some factors participating in the formation and development of DC. In the dissertation paper (1969) we stated that in 124 paients, familial incidence of DC was ascertained in 12%. Later we increased the representative group by further 80 operated on patients "at random" without special selection. Thus our report concerns 204 operated on patients from the catchment area of the eastern half of Slovakia, 174 men and 30 women. We recorded the familial incidence on basis of detailed and aimed case history in 23%, i. e. in 47 patients, 7 of them women. We ascertained incidence of DC in the family tree as far back as three generations (vertical incidence) in practically half the cases (10%). The other cases (13%) concern the incidence of DC in brothers and sisters (horizontal incidence). Besides the incidence of DC in the family tree, we studied in the examined patients also general morbidity in the family tree and compared it with the general morbidity in patients suffering of DC who did not state familial incidence of DC. We should like to point out the interesting fact that we recorded increased accumulation of associated diseases in patients with positive case history in the family and in their relatives in the family tree as well as in patients without DC inci-

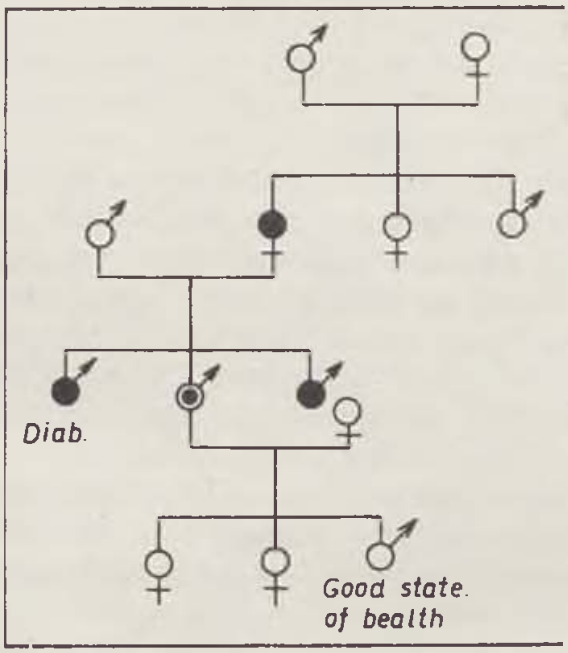
dence in their family and their relatives. We are not discussing general morbidity in greater detail, because we deal with this question in another report. In this report we are merely including a lucid table recording all the diseases occuring in connection with DC and their relation to the mesenchyme and examples of four genealogical schemes recording aimed personal and familial case history.

We consider it important to remark that our data on familial and hereditary incidence of DC as well as the data by other authors do not completely correspond to the actual situation. In reality we assume an even higher familial and hereditary DC incidence. The reason for the inaccurate data by the individual authors as well as our own data, is due to the generally known difficulties with which we meet in genealogical research. The difficulties we encountered when working on these problems were mainly caused by the considerable dispersion of the probands relatives in respect of space and age. The initial stage of the contracture is discrete, DC starts at later age and the afflicted person complains of the disease only rarely. For this and other reasons it is not only impossible to obtain absolutely precise data on the generation of the proband, the problems is even worse in respect of the older generations, several persons bein already dead. In spite of the mentioned difficulties we are nevertheless justified to assume that in a certain percentage of DC cases the actually exists c o n g e n i t a l d i s p o s i t i o n and increased perceptiveness to DC and other types of mesenchymal tissue diseases. We assume on the basis of our findings that this disposition is only being realized when it comes to the "fateful" clash of the disposition with further diseases and noxae which affect the autoimmunologic balance of organism unfavourably. A single accident on the palm or chronic micro- or macrotraumata, festering palm, nervous lesions a. o. which we may summarily call the l o c a l l y provoking f a c t o r, causes the release of the formation and development of DC in the sensibilized individual or in the individual pre-



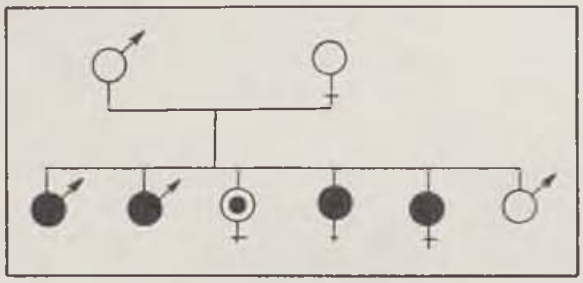
Genealogic scheme 2. V. A., born 1911, case history Nr 5192. — Case history: heavy coxartrosis, asthma bronchiale, lung emphysema. — Family case history: Father died of asthma bronchiale complications. Mother died of general calcification of vessels. — Duration of the disease: Left hand: since 1958, right hand: since 1958. — Incidence of DC in the family

disposed to the forming of DC due to heredity or acquisition (Kipikaša 1968, 1969, 1970). Our observations do not enable us to specify the mechanism by which the inherited dispositions are communicated and for this reason we can not even refute the opinion expressed by authors claiming the dominating or



Genealogic scheme 3. K. J., born 1911, case history Nr 5592. — Case history: suffers of stomach ulcer, atherosclerosis, polyneuritic syndrome, syndrome cervicobrachiale. — Family case history: Father died of lung inflammation Mother died of lung cancer. The eldest brother died of lung cancer. The elder brother suffers of diabetes. — Duration of disease: left hand: approximately since 1963, right hand: approximately since 1963. — Incidence of DC in the family

recessive type of heredity. We are also aware however that a number of factor participates in the DC forming and that each etiopatogenetic DC study which only deals with one link and does not take the complicated chain of etiopatogenetic factors into consideration, can not aid the grasping of the causes and



Genealogic scheme 4. M. E., born 1903, case history Nr 5758. — Case history: heavy articular rheumatism, frequent urticaria. — Family case history: Father died of general vessel calcification. Mother suffered of asthma bronchiale, vessels calcification. Brother died at the age of 55 of complications of "incurable influenza". — Duration of disease: left hand: — right hand: since 1956. — Incidence of DC in family.

the development of this disease in a satisfactory manner. We also watch the familial incidence and the share of heredity in the forming and development of DC from this point of view. Karfík (1949) also drew attention to this complication and to the participation of several factors affecting the forming and development of DC.

SUMMARY

The report is a brief survey of data obtained from world literature on the familial and hereditary incidence of Dupuytren's Contracture. Furthermore the report on the findings of genealogical research by the author. Incidence of DC was ascertained in the family tree in 23% of the patients, 13% horizontally and 10% vertically. At the same time increased morbidity was ascertained in these family trees but it did not differ considerably from morbidity in patients and their relatives with no familial DC incidence. Practically all diseases occuring in connection with DC affect the tissue of mesenchymal origin or possess autoimmunologic background.

The author considers it impossible to accept heredity as the sole etiopatogenetic factor, it is rather a single link in the complicated chain of etiopatogenetic DC factors.

The report comprises two tables and four examples of recorded family trees with horizontal and vertical DC incidence.

RÉSUMÉ

La part d'héréditage touchant le développement de la contracture de Dupuytren

A. Kipikaša

Le travail présente en bref les données de la littérature du monde entier de la présence héréditaire et familiale de la contracture de Dupuytren. La partie suivante décrit des résultats du propre travail généalogique. L'apparition de la contracture du Dupuytren était présente dans 23 %, dont la médianne dans 13 %, la verticale dans 10 pour cent des cas. Paralellement, une grande tendence aux maladies a été trouvée dans les familles citées, mais celle-ci ne différait pas de la tendence aux maladies des malades et leurs parents sans le développement familiale de la maladie de Dupuytren. Les maladies accompagnant la maladie de Dupuytren touchent le plus souvent les tissus d'origine de mézenchyme, respectivement ils se basent sur le fond autoimmunologique.

Les auteurs sont d'avis, que le component héréditaire ne peut pas être considéré en tant que seule cause étiopathogénétique, mais comme une partie des facteurs étiopathogénétiques de la maladie de Dupuytren.

Le travail est illustrée par deux tableaux et quatre démonstrations des formes de cartes généalogiques avec l'apparition verticale et horizontale de la maladie de Dupuytren.

ZUSAMMENFASSUNG

Anteil der Erblichkeit an der Entwicklung der Dupuytrenschen Kontraktur

A. Kipikaša

In der Arbeit legt der Autor eine kurze Übersicht von Angaben aus der Weltliteratur über das familiäre und erbliche Vorkommen der Dupuytrenschen Kontraktur vor. Im weiteren Teil befasst sich der Autor mit Erkenntnissen aus eigener genealogischer Forschung. Das Vorkommen der Dupuytrenschen Kontraktur im Stammbaum wurde in 23 % der Fälle gefunden, darunter horizontal in 13 % der Fälle, vertikal in 10 %. Zugleich ist auch erhöhte Morbidität in diesem Stammbäumen ermittelt worden, diese unterscheidet sich jedoch keineswegs wesentlich von Kranken und ihren Verwandten ohne familiäres Vorkommen der DK. Fast alle in Verbindung mit der Dupuytrenschen Kontraktur vorkommenen Krankheiten betreffen Gewebe mesenchymalen Ursprungs, beziehungsweise haben einen autoimmunologischen Hintergrund.

Wird sind der Meinung, dass die Erblichkeit nicht als der einzige äthiopathogenetische Faktor anzusehen ist, sondern lediglich als ein Glied in der komplizierten Kette der äthiopathogenetischen Faktoren der DK.

Die Arbeit illustrieren zwei Tabellen und vier Vorführungen von Stammbaumverzeichnungen mit horizontalem und vertikalem Vorkommen der DK.

RESUMEN

Parte de la herencia en el origen de la contractura de Dupuytren

A. Kipikaša

En el trabajo presentamos un informe resumido de los indicaciones de la literatura mundial sobre la frecuencia familiar y hereditaria de la contractura de Dupuytren. En la parte siguiente presentamos los conocimientos de nuestra propia investigación genealógica. La presencia de la contractura de Dupuytren en el árbol genealógico comprobamos en 23 por ciento, de lo que la horizontal en 13 por ciento, la vertical en 10 por ciento. Al mismo tiempo comprobamos la enfermedad aumentada en los árboles genealógicos mencionados pero esa no se diferenció considerablemente de la enfermedad de los pacientes y sus parientes sin la presencia familiar de la contractura de Dupuytren. Casi todas las enfermedades, las que se encuentran en la conexión con la contractura de Dupuytren afectan los tejidos del origen de mesenquima, respectivamente tienen el fondo autoimunológico.

Somos de la opinión que la herencia no puede considerarse como el solo factor etiopatogenético, pero solamente como un eslabón en la cadena compleja de los factores etiopatogenéticos de la contractura de Dupuytren.

El trabajo es ilustrado con dos cuadros y con cuatro extractos del registro del árbol genealógico con la presencia horizontal y la vertical de la contractura de Dupuytren.

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Doc. Dr. A. Kipikaša, FN Košice, Czechoslovakia

Rostov Medical Institute, Rostov-on-Don (USSR)
rector Doc. Y. D. Ryzhkov,
Department of Hospital Surgery
head Prof. P. P. Kovalenko

HOMOLOGOUS-TENDON PLASTY OF HAND AND FINGER FLEXOR TENDONS

P. P. KOVALENKO, N. P. DEMICHEV

Several studies (Degtyareva, 1959 and 1966; Yumashev, 1963; Kovalenko et Demichev, 1964 and 1966; Beringer, 1966; Kolontay, 1966; Rozovskaya, 1966; Krupko et Tkachenko, 1967, and others) have dealt with the employment of conserved tendon grafts in the reconstruction of finger tendons. However, the question as to whether or not it was suitable to use homologous-tendon grafts for the repair of defects in flexor tendons of the hand and fingers, has been little investigated.

The present paper presents a report on the experience with 74 conserved homologous-tendon grafts used in the treatment of 44 patients with injuries to the flexor tendons of their hands and fingers. In 28 of them, the operation was carried out on the right, and in 16 on the left hand. In four patients four fingers, in another four three fingers, in ten two fingers, and in 26 only one finger, were treated in this way. In 15 patients with damage to the flexor tendons, the digital nerves were also involved, resulting in hypaesthesia, and in four patients there was marked hyperaesthesia due to the presence of a neurinoma.

The operation was performed at an interval of one month to 16 years after the accidental wound had healed. The method was as follows:

An arched skin incision (according to Dubrov) was made in the palm of the hand, and in some cases the old scar was excised at the same time. After exposure of the proximal tendon stump, which proved simple enough in most cases (except in the first case, where the scarred tendon stump tore apart and had to be searched for on the forearm from an additional incision), incisions were made on the fingers. As is generally known, the incisions in old injuries differ from those in fresh ones. The incisions in the palm and fingers should, according to the authors' opinion, be long enough so as to give sufficient room for manipulation. However, they should not divide the tissues at right angles to the course of the tendons, in order to prevent scar contractures from de-

veloping. The incision is different on every finger (Fig. 1). A semioval incision should be made in the index finger on its volo-ulnar aspect, wihle in the little finger on the volo-radial aspect. In the middle and ring fingers, the incisions can run on the volo-ulnar or the volo-radial side. The incision in the thumb should go along the lateral aspect with a slight curve towards the thenar eminence. All these incisions should be made so that the neurovascular bundle remains unscathed, or more exactly, so that it does not

Fig. 1. Incisions in hand and fingers in homoplastic repair of flexor tendon defects

become included in the flap of skin which is to be mobilized by dissection. In order to prevent damage to the nerve in the thumb, the arched incision on the terminal phalanx should be made proximal to the tip of the digit, i. e., nearer to the interphalangeal joint.

After exposure and dilation of the tendon sheaths with Rozov bougies No 4 to 6 (the size to be chosen with regard to the age of the patient and the calibre of the fibrous canal), the surgeon proceeds to prepare the grafts.

At this stage of the operation, exposure of the distal and proximal stumps of the flexor profundus tendon proves most difficult. The distal stumps were rarely found to be mobile they usually adhered to the tendon sheath. When the proximal stump was fixed by scarring to a side between the palmar incision (which is usually made along the distal flexion crease in the palm) and the flexion crease of the finger, the flexor profundus tendon was divided at the level of the skin incission, a retaining stitch laid to each end of the

tendon segment, and the distal end pulled out of the incission in the finger by the thread. This proved a simple enough and efficient procedure. Extraction of this end from the wound in the finger was quite easy. The advantage of the method lies in that the proximal stump of the flexor profundus tendon is not mobilized by the pull and the severance of adhesions of the tendon with its sheath and the aponeurosis by means of a Rozov raspatory, but as a result of the separation of tendon fibres from the site of adhesions. This method of

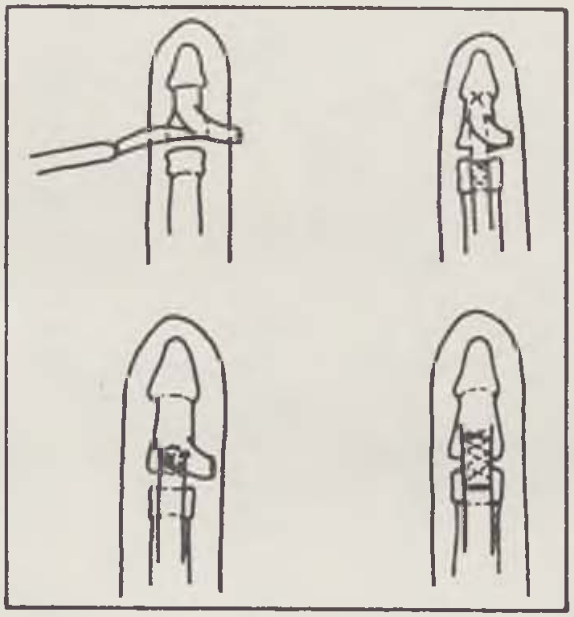


Fig. 2. Suture of homologous-tendon graft to terminal phalanx by the authors' own modification of the method

tendon stump mobilization was used in 28 operations, and only in two of them was the capsule of the interphalangeal joint peeled off by this manoeuver. Where the flexor sublimis tendon proved unsuitable as material for a tenoplasty, it was excised and removed. In cases, where it was evident that it would be impossible to join the stumps of the severed tendon, the defect was bridged with a homologous-tendon graft.

The tendon grafts must be of a calibre which permits free movements of it inside the tendon sheath, must be covered by the peritendineum (but *not* by the paratenon), and must be elastic. Homologous tendons of the flexor sublimis, the long extensor of the foot and the peronaeus longus or brevis, provided they are long enough and of a suitable calibre, are used for the purpose; tendons with a smaller calibre are permissible, but in no case must a graft be used which is thicker than the tendon to be repaired. This and the postoperative oedema of tissues would then lead to an increase in pressure inside the tendon sheath, which constitutes a real danger of the subsequent development of massive adhesions.

In the following stage of the operation, the tendon graft is placed into the tendon sheath. A flexible guide sound with a club-like thickeningt at the

one end and a thick silk thread fastened to the other, is first introduced, and the tendon graft then pulled into the sheath from the incision in he palm and sutured to the distal stump of the flexor profundus tendon or the periosteum of the terminal phalanx with three or four kapron stitches according to Dubrov. Reconstruction of the tendon sheaths is obligatory.

Since 1963, the procedure of attaching the tendon graft to the terminal phalanx has been modified by the authors, and is now carried out in the following way (Fig. 2). A Kuneo kapron stitch is laid to the end of the graft to be sutured to the phalanx. After the graft has been threaded through the tendon sheath, it is pulled by the thread to and buried in the recipient bed

Tab. 1: Results of Homoplasty of Flexor Tendons of Hand and Fingers

Site of injury	Number of repaired tendons	Number of patients	Healing of wounds		Results of operation		
			1st intention	2nd intention	good	fair	poor
Fingers	40	27	39	1	17	19	4
Hand	27	14	27	—	8	11	8
Wrist and Forearm	7	3	7	—	7	—	—
Total	74	44	73	1	32	30	12

prepared under the distal flexor profundus tendon stump which can easily enough be dissected from its site of insertion, and then the thread is tied. When pulling the graft through the tendon sheath, the lateral fibrous bundles of it are somewhat loosened and separated from the central bundle. These lateral bundles are then sutured with two kapron stitches to both sides of the tendon insertion. The surplus of flexor profundus tendon (more than 0.5 cm) is now excised to avoid formation of a drumstick thickening in the finger tip. The skin wound on the finger is closed, the graft sutured to the proximal stump of the recipient tendon with kapron stitches according to Kuneo, and the site of tendon suture as well as the part of the graft situated in the palm are covered with the lumbrical muscles. The skin wounds are sutured with silk.

The patients who had undergone operation, were periodically called to the department for check-up. Thus, in all 44, the following data were collected.

The patients were re-examined at intervals ranging between five months and four years and seven months; four of them between five months and one year, eleven between one and two years, eleven between three and four years, and five more than four years after operation. It is evident that most patients were checked up after one or more years. This is considered an important mo-

Tab. 2: Results of Surgical Treatment in Relation to the Method of Tendon Graft Conservation

Result	Freezing at			Lyophilization	Total
	−25°	−60°	−183°		
Good	5	11	10	6	32
Fair	7	8	8	7	30
Poor	1	1	8	2	12
Total	13	20	26	15	74

ment in the evaluation of results of tenoplasty. The final results are given in Tab. 1.

The skin wound healed by first intention after 73 operations; only in one patient did suppuration take place.

All patients in whom conserved homologous-tendon grafts had been used, tolerated the transplantation well; no complications were observed in the post-operative period.

Usually, in the first two to four days after operation, the body temperature rose from 37.1° to 38.2 °C; in some patients, the temperature did not rise at all after operation.

The late results were found good in 32, satisfactory in 30, and poor in twelve patients.

Most contemporary surgeons consider the results of surgical treatment to be dependent on the method of tissue conservation. This is the reason why the above series of 44 cases was analyzed from this point of view. It emerged that the results after operation were almost the same, irrespective of the homologous-tendon grafts had been conserved (Tab. 2).

Tab. 3: Results of Surgical Treatment in Relation to the Duration of Storage of Tendon Grafts Frozen at −25°, −60° and −183°

Duration of tendon graft storage (in days)	Results of operation			Total
	good	fair	poor	
14 to 30	7	3	1	11
31 to 60	7	7	4	18
61 to 90	4	9	2	15
91 to 120	—	—	—	—
121 to 190	6	1	2	9
191 to 398	2	3	1	5
Total	26	23	10	59

The results of operation evaluated with respect to the duration the frozen tendon grafts are stored, are also of great interest. Analysis of late results has shown that the time of graft storage has practically no influence on the regularity or the sequence of both the good and poor outcome of surgical treatment (Tab. 3).

It can be seen from Tab. 3 that

1. in the ten cases with poor results, tendon grafts stored for a period of 14 to 90 days were used, and only in three cases did this time exceed six months, and that

2. in 18 out of 26 cases with good results, tendon grafts stored at freezing temperatures for short periods, and in eight cases, grafts stored in the same way for longer periods were employed.

It thus becomes evident that the clinical results are almost the same, independent of the duration of graft storage.

Tab. 4: Results of Surgical Treatment of Defects in Flexor Tendons in Relation to Time Interval between Injury nad Operation

Time since injury (in months)	Results of homoplasty			Number of reconstructed tendons
	good	fair	poor	
1 to 2	7	4	1	12
2 to 6	19	19	11	49
6 to 12	2	4	—	6
12 to 204	4	3	—	7
Total	32	30	12	74

The authors also convinced themselves that the interval between injury and operation had no influence on the results of homologous-tendon plasty.

Evaluating the clinical material referred to above, interesting and, from a practical point of view, very important information has been disclosed (Tab. 4). The data referred to in Tab. 4, of course, are of a relative significance, because the level of the injury, the number of injuried tendons, the method of surgical treatment, the type of post-operative healing, the tendency towards scar adhesions, the initiative of the patient himself with respect to his rehabilitation, etc., must be taken into account, when evaluating the results of homologous-tendon plasty.

It is peculiar to find from Tab. 4 that bad results were registered after the reconstruction of tendons which had beed injured up to six months prior to operation. However, this does not indicate that employment of homologous-tendon grafts was unsuitable soon (two to six months) after injury to the tendons. On the contrary, this circumstance one again underlines the expedience of using homologous-tendon grafts, because of their valuable biolo-

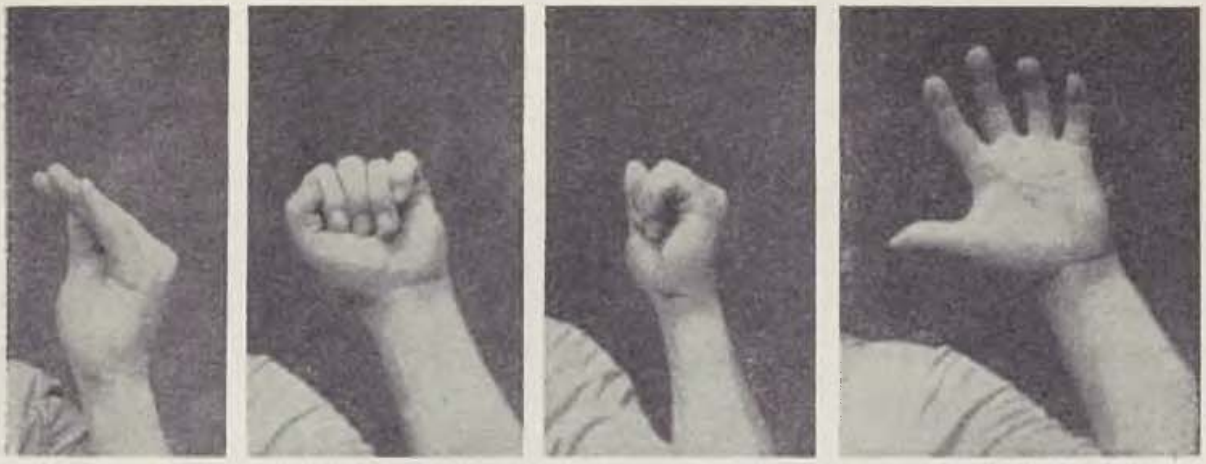
gical properties, even in patients who suffered an injury to tendons three or more years previously.

The following case history is given as illustration of a good result after homologous-tendon plasty.

Patient M. V. S., a man aged 28, was admitted to the Departmetn on Dec. 4, 1965, complaining of not being able to bend the fingers, except the thumb, of his left hand, and of not having enough feeling in them. It was found that he had severed the flexor sublimis and profundus tendons at the level of the distal flexion crease in the palm by an injury which he had sustained from a circular saw on June 30, 1965. The tendons had been sutured 24 hours after the accident. Though the wound had healed by first intention, active movements of the fingers had never been restored.

The general condition of the patient was satisfactory. On the volar aspect of the left hand, there was a linear scar running along the distal flexion crease of the palm. The four fingers were slightly atrophic, could not be flexed, and movements in all their joints were greatly limited. Tactile and pain sensitivity was also affected in these fingers.

On Dec. 10, 1965, operation, bridging of the defect in the flexor profundus tendon, was performed on the index, middle and ring fingers of the left hand with homologous-tendon grafts, and in the little finger the tendon stumps were joined by secondary tendon suture. (The surgeon was N. P. Demichev). During operation, the patient lay on his back with his left arm abducted. The incision in the skin of the palm was made parallel to the old scar in the distal flexion crease. The site of injury to the flexor sublimis and profundus tendons was exposed, and it was found that the atrophied flexor profundus stumps of the index and middle fingers were firmly adherent to the respective stumps of the flexor sublimis tendons and to the surrounding tissues. The proximal ends of the flexor profundus tendons of the ring and little fingers could not be found. The distal stumps of the flexor profundus tendons were freed of scars from additional skin incisions in the fingers. Typically, all distal flexor tendon stumps of the fingers had regenerated; they were found loose and flaccid. On dissection, the insertion of the flexor profundus tendon to the terminal phalanx of the ring finger was torn off. The defects in the flexor profundus tendons of the index and middle fingers were bridget with homologous-tendon grafts, frozen at —183 °C and stored for 164 days (donor No 172, blood group A II). The grafts were 10 cm long and 0.4 to 0.5 cm thick. The defect in the flexor profundus tendon of the ring finger was also bridged with a homologous-tendon graft whose proximal end was sutured to the flexor sublimis stump, and the distal end to the periosteum of the terminal phalanx, because there were no remnants of the flexor profundus insertion. The mobile, i. e., not involved in scar tissue, distal flexor profundus tendon stump of the little finger was sutured end-to-end (according to Kuneo) with the proximal stump of the flexor sublimis tendon. The sites of tendon suture and parts of the grafts were wrapped in the lumbrical muscles. The skin was sutured with silk, and the arm immobilized in a plaster slab.



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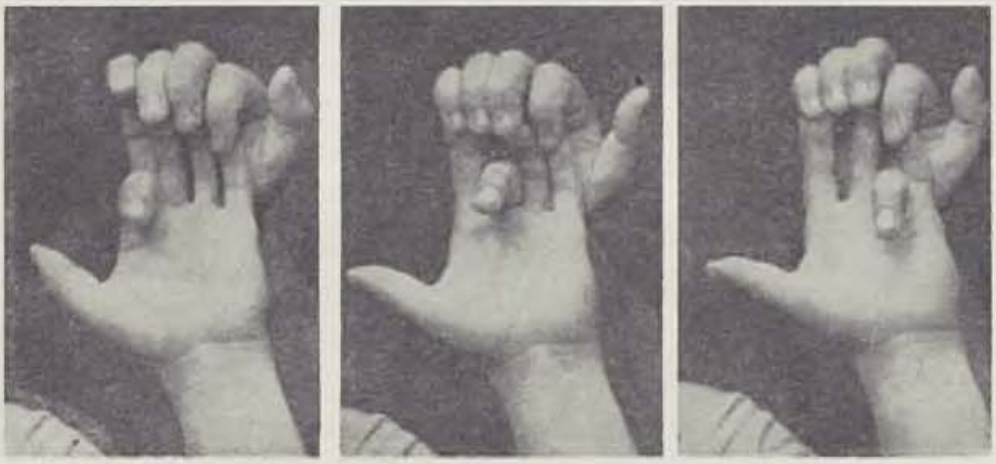

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Fig. 3. Patient M. V. S., a man aged 28, with damage to flexor tendons of all four fingers of left hand, combined with hypaesthesia. — a) prior to operation (patient cannot flex the four fingers); b), c) and d) 17 months after repair with homologous-tendon grafts conserved by freezing at —183 °C (full flexion and extension of all fingers); e) active flexion of index finger only; f) active flexion of middle finger only; g) active flexion of ring finger only.

The post-operative period was uneventful. Thirteen days after operation, the stitches were taken out; the wounds had healed by first intention. The patient was discharged from hospial on Dec. 25.

He was first re-examined 17 months later. Function of the index, middle and ring fingers was restored to the full (Fig. 3), but that of the little finger could only be considered satisfactory (according to Dubrov).

Thus the bridging of large defects in tendons with homologous-tendon grafts has given a good functional result, in spite of the fact that these were multiple injuries to the tendons of the hand at the level of the distal flexion crease of the palm.

The authors' clinical experience permits to conclude that, except of autoplasty, the best of all methods of bridging defects in flexor tendons is homologous-tendon plasty. This type of plasty must win recognition. Disregarding the contradictory opinions which are mainly based on the results of experiments, further improvement of the methods of tendon conservation and surgical procedure, as well as the employment of rational remedial exercises together with a complex of physical therapy, will lead to a decrease in postoperative complications and thus to improvement of the results of reconstructive operations on the flexor tendons of the hand.

CONCLUSIONS

1. Homologous-tendon grafts may successfully be employed in the treatment of old injuries to the flexor profundus tendons of the hand and fingers at levels of the wrist, the palm and the proximal and middle phalanges.

2. Employment of homologous-tendon grafts is indicated in the one-stage reconstruction of several tendons (in two to four fingers), in dystrophic changes in the proximal tendon stumps, and in a large defect which cannot be overcome by approximation of the two tendon stumps or by bridging it with autologous tissues.

3. The methods of conservation (lyophilization or freezing at —25°, —60° or —183 °C followed by storage at —25 °C) as well as the duration of storage of the thus conserved homologous-tendon grafts do not affect the results of surgical treatment. Clinical experience has shown that lyophilized as well as frozen tendon grafts are, at the present stage of development of plastic surgery and tissue conservation, a suitable material for the plastic repair of flexor digitorum profundus tendons injured at any level.

SUMMARY

The paper deals with the employment of 74 frozen or lyophilized homologous-tendon grafts in the treatment of 44 patients with injuries to the flexor tendons of the hand and fingers. The skin wound healed by first intention after 73 operations; suppuration developed only in one patient. The functional results of the plasties, as checked up five months to seven years and four months after operation, were as follows: good in 32, satisfactory in 30 and poor in twelve cases.

According to the authors' experience, the method of conservation (lyophilization or freezing) of the homologous-tendon grafts, as well as the duration of their storage, have no influence on the results of surgical treatment.

It has been emphasized that of all the methods of repairing defects in tendons autoplasty is the best, but homoplasty is second in place. This latter method should be given full recognition.

RÉSUMÉ

L'homoplastie des fléchisseurs de la main et des doigts.

P. P. Kovalenko, N. P. Demitchev

Le travail cite l'application des 74 des transplants homologues en état de congélation ou refroidis chez 44 des malades atteint du traumatisme des fléchisseurs de la main et des doigts. Les 73 opérations faites les plaies guérissaient per primam, seulement dans un cas il y avait de l'infection. Les résultats de la fonction examinés dans la période de 5 mois a 4 ans 7 mois étaient bons dans 32 des cas, satisfaisant dans 30 cas et mauvais dans 12 des cas.

L'expérience des auteurs afforme que le refroidissement et la congélation ni le temps de conservation des transplants homologues de tendons des fléchisseurs n'influence guère le résultat de l'opération. Les auteurs veulent souligné que l'homoplastie est, à part l'autoplastie, la meilleure mode de surmonter les défauts des tendons fléchisseurs. La méthode doit être bien appréciée.

ZUSAMMENFASSUNG

Sehnenhomoplastik der Hand- und Fingerbeugemuskeln

P. P. Kovalenko, N. P. Demitschev

Die Mitteilung berichtet über die Anwendung von 74 tiefgekühlten oder lyophilisierten homologen Pfropfen bei der Behandlung von 44 Kranken mit Verletzungen der Sehnen der Hand- und Fingerbeugemuskeln. Bei 73 Operationen heilten die Handwunden primär; lediglich bei einem Kranken ist Eiterung vorgetreten. Die Funktionsergebnisse bei Überprüfung nach 5 Monaten bis 4 Jahren und 7 Monaten waren: in 32 Fallen gut, in 30 Fällen befriedigend und in 12 schlecht.

Aus der Erfahrung der Autoren ergibt sich, dass weder das Verfahren (Lyophilisierung oder Tiefkühlung) noch die Konservationsdauer auf das Operationsergebnis Einfluss haben.

Die Autoren heben hervor, dass nach der Autoplastik die Homoplastik das beste Verfahren zur Überbrückung der Defekte in den Beugemuskelsehnen darstellt. Diese Methode verdient volle Anerkennung.

RESUMEN

Homoplástica de los tendones de los músculos de la mano y la de los dedos

P. P. Kovalenko, N. P. Demichev

El informe trata de la aplicación de 74 injertos homólogos congelados o liofilizados en el tratamiento de 44 enfermos con la herida de los tendones de los músculos de la mano y la de los dedos. Después de 73 operaciones las heridas de la piel se cicatrizaron primariamente; solamente en un paciente ocurrió la supuración. Los resultados de función, reexaminados en el tiempo desde 5 meses hasta 4 años y 7 meses fueron: en 32 casos buenos, en 30 casos satisfactorios y en 12 casos malos.

De las experiencias de los autores es evidente que ni el modo (la liofilización o la refrigeración) ni el tiempo de la conservación de los injertos homólogos de tendón tiene ninguna influencia al resultado de la operación.

Los autores quieren acentuar que la homoplástica además de la autoplástica es el óptimo modo de embovedar los defectos en los tendones de los músculos. Este método merece lleno reconocimiento.

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Prof. P. P. Kovalenko, ul. Engelsa 56/kv. 60, Rostov-on-Don, USSR

Sociedad Colombiana de Cirugía Plástica Maxilofacial y de la Mano

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IV Yugoslav Congress for plastic and maxillofacial surgery with international participation 12—20th may, 1972, OHRID, Yugoslavia.

Program of the Congress: hand surgery, pathology of the temporo-mandibular joint, complex injuries of the lower extremities, novelty in plastik surgery, experimental work, free themes, assambly of national association.

Registration of papers of films antil 1-II-1972. Brief summary until 1-III-1972. Prof. Dr. Jovan PANOVSKI City Hospital — Skopje, 91000; Yugoslavia.

Profesor Demjén sixty years old.

Surrounded by intensive work and "ever running hospital life" professor Demjén is celebrating on Feb. 12, 1972 his 60 birthday.

He is a head of the department of plastic surgery at the University Hospital Bratislava and a chairman of the Czechoslovak College of Plastic Surgeons.

After completion of his high school studies at Banska Bystrica, he was enlisted as a medical student at the Charles University in Prague and graduated in 1938.

His first teacher was Dr. Petelen, where he worked at the department of surgery, B. Bystrica Hospital. Than he is leaving for Bratislava, to work under professor Čarsky and since 1945 he is in charge of the surgical ward at the Rožňava Hospital. He is decided to study plastic surgery after seeing hundreds of post-war disfigurations and he is going to study plastic surgery to Prague, under professor Burian, who was that time very well known personality in this field.

In 1947, thanks to the scholarship of the British Medical Council, he is leaving for England, where he is taking training at East Greansted under Sir A. Mc. Indoe and following this under the supervision one of the biggest personalities known in plastic surgery world — Sir Harold Gillies and professor Kilner in London and Oxford.

After finishing his studies of plastic surgery in 1949 he is returning home. Professor Čarsky, with the great understanding for plastic surgery, is giving him

a plastic surgery ward with 20 beds, at the dept. of surgery at the University Hospital Bratislava. Here, is operating upon his first patients, with a help of his few enthusiastic collegues.

On May 1, 1951 he is given a new building in the area of the University Hospital and he is appointed to be in charge of the department of plastic surgery with 35 beds. In 1952 he becomes an associate professor of Plastic Surgery and his department is enlarged to 67 beds including 30 beds for childern.

After 13 years he is a professor of plastic surgery and a head of the division of plastic surgery at the University Hospital in Bratislava.

Professor Demjén's school achieved amazing results. Gradually there is established a histo-pathology lab, photography lab for documentation, in 1953 the emergency service for facial and hand injuries and a physiotherapy ward.

In 1963 there is established a centre for cleft lip and palate for whole Slowakia, which is cooperating with maxillofacial and the speech therapy departments. This is the only one of its kind in Czechoslovakia.

Professor Demjén in order to keep a contact with the progress of plastic surgery is working in 1966 for one year with Professor M. Converse in New York, and as a visiting professor of plastic surgery at the University of Iowa, USA, in years 1968—1970.

Also working on research problems there, he is a co-author of six publications, and the author of monography "The clef palate" where is describing his own method of palatoplasty.

Thanks to him the department of plastic surgery of the University Hospital in Bratislava, became known abroad. Professor Demjén is a member of many scientific associations: The British Associations of Plastic Surgeons, International Confederation for Plastic and Reconstructive Surgery, The International Society for Burn Injuries, International Society of Cranio-Facial Biology, American Cleft Palate Association, American Academy of Facial Plastic and Reconstructive Surgery, American Society of Plastic and Reconstructive Surgery, and he was asked to be a Member of the Royal Society of Medicine.

Professor Demjén is an author of many new methods in plastic surgery such as the usage of large free skin grafts, new method of palatoplasty, surgical technique and a post-operative treatment described by himself.

Thinking about professor Demjén with admiration, thank-fulness and appretiation we would like to wish him on behalf of his staff and on behalf of thousands of his patients "many happy returns of the day" many years of happiness and satisfaction in his personal and professional life.

The staff of the department of plastic surgery of
the University Hospital Bratislava

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