ACTA CHIRURGIAE PLASTICAE

INTERNATIONAL JOURNAL
OF PLASTIC SURGERY

13 · 3

1971

Acta chir. plast. 13 : 3 : 1971

AVICENUM - CZECHOSLOVAK MEDICAL PRESS
PRAGUE

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

ACTA CHIRURGIAE PLASTICAE — 13, 3, 1971

Scientific Research Institute of Traumatology and Orthopaedics
Director G. G. Slesarev, Cand. Med. Sc.
Department of Conservation and Transplantation of Organs and Tissues
Director V. I. Savelyev, Dr. Med. Sc.
Novosibirsk (U.S.S.R.)

SOME METHODS OF PREPARATION AND CORSERVATION OF TISSUE GRAFTS WITHOUT ASEPTIC TECHNIQUE

V. I. SAVELYEV

It is well known how many technical and organizational difficulties have to be overcome by the staff of tissue banks on preparation of cadaver tissues under sterile conditions of an operating theatre. However, even the most meticulous observance of preventive measures is not always successful; between 3.3% to 20% of the thus prepared bone grafts have proved non-sterile and must be discarded (Tkachenko, 1966; Ryzhkov et al., 1966; Hyat el al., 1952; Turner et al., 1956; Chalmers et al., 1958). In this respect, much better results can be achieved with preparing cadaver tissues for conservation by physical (γ-rays, accelerated electrons) or chemical (antibiotics-propiolactone, aethylene oxide, etc.) means of sterilization. The physical means are not yet easily enough accessible for the broad practice, because their equipment is complicated and expensive, protection against them is cumbersome, and highly qualified personnel is required to operate them. Chemical sterilization, on the other hand, is usually carried out with liquid substances, is much simpler and does not require any large material expenditure. However, even this method of preparation, the principles of asepsis cannot be neglected completely because after sterilization, the material must be laid out in sterile containers and sealed off hermetically. In spite of the fact that the material is laid out quickly and without being touched by hand, the danger of secondary contamination from the air or by contact is still present.

This is why, in the author's opinion, the methods of procurement and preparation of tissue grafts, in which asepsis can be neglected altogether, acquire an increasing significance. With them, not only the conditions of work and the technical side of the procedure are simplified, but the whole process of tissue preparation becomes more economical (see tab.). Three such methods which have been subjected in the laboratory to overall experimental and clinical tests for the last eight years, are presented below.

Tab. 1

Consecutive number	Conditions necessary for procurement of sterile tissues, which may be omitted in case preparation is carried out without observance of principles of asepsis
1	Organization (equipment and outfit) of an operating box at the morgue or in the building of the tissue bank
2	Training of highly qualified personnel fully acquainted with the rules of work in an operating theatre or box
3	Sanitary preparation of donor cadavers prior to taking tissue grafts from them
4	Strict abservance of the principles of asepsis and antisepsis when taking tissue grafts (preparation of premises for sterile work and analogous preparation of personnel and the donor cadaver)
5	Observance of proper sequence when excising the graft from the donor (in order to prevent contamination), Change of sterile gowns, gloves, towels and
6	instruments when grafts are taken from several donor cadavers

Method 1: Sterilization and conservation of homo- and heterologous tissues is carried out with liquid substances. The technique of preparation is simple enough and consists of the following: Non-sterile specimens (bone, cartilage, skin, fascia, etc.) are, after respective mechanical processing, immerged in one or another conservative to which the sterilizing agent is added. If an antiseptic complex is used, it should consist of 200,000 units of mycerin (neomycin), 200,000 units of polymixin, 0.005 g of furasolidin and 0.25 g of pipolphen (diprazin) per 100 ml of solution. β-propiolactone as sterilizing agent is used in a 1% concentration together with sodium hydrophosphate

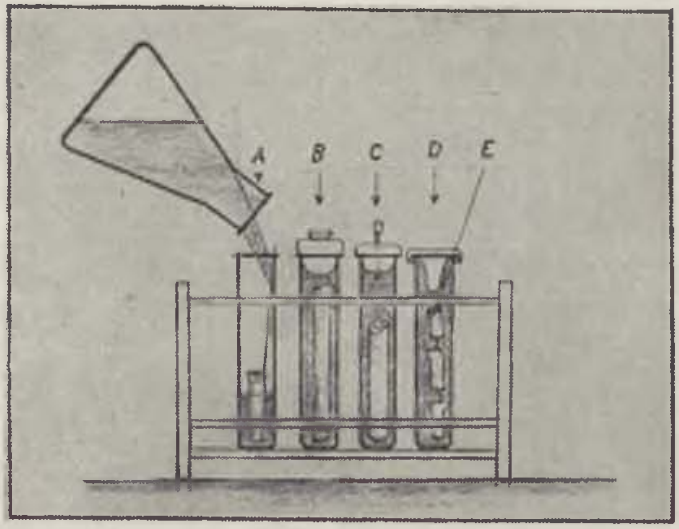


Fig. 1. Gel-containing sterilizing medium is poured into the phials with tissue grafts (a) and various modes of sealing the phials: cotton-wool-in-gauze plug (b), rubber plug with needle for letting out air (c), rubber dummy with tip pointing towards the grafts (d)

(Na_2HPO_4) at 3.0 to 3.5 g per 100 ml. After addition of the above substances to the solution, the container with the grafts is sealed hermetically and placed in an ordinary refrigirator at a temperature of 2^0 to $5\,^0$C. Sterilization at the given temperature takes 24 hours. Conservation of the grafts is carried out in the same refrigirator; the optimal time of storage depends on the kind of conservative used (usually no longer than three to five weeks).

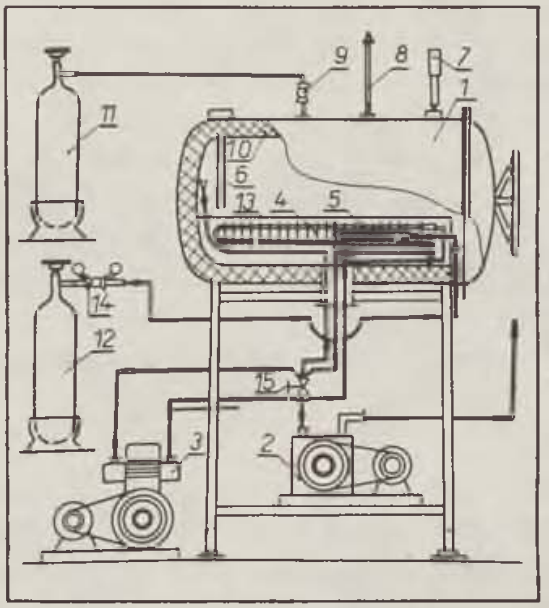


Fig. 2. Diagram of apparatus for gaseous sterilization of tissue grafts — side view. (For description see text)

M e t h o d 2: Sterilization and conservation of tissue grafts is carried out with media containing gels. These media were developed at the laboratory and consist of the conservative solution (No 9 TSOLIPK, No 7 TSOLIPK, 31-E LIPK, Tirode and others), of the gel (gelatine or agar-agar) and of the sterilizing agent (antiseptic complex or β-propiolactone). The combination of the conservative with the gel and sterilizing agent results in formation of a compact, elastic and pliable mass which possesses high bactericidal and conservative properties. The gel-containing sterilizing medium is prepared either immediately prior to its employment or in reserve. Agar or gelatine is added to the conservative solution (contained in a boiling-flask of sufficient volume) in the amount required for a 1% and a 7—9% solution respectively. A combination of gels may be used, such as a mixture of 0.5% agar and 5% gelatine. Then the flask with its contents is place in a water bath for warming up. The molten agar (gelatine) should be boiled for 30 to 40 minutes, and the antiseptic complex is added to it in the same way as described for method 1. Here it should be pointed out that in all cases in which pipolphen (diprazin) has been used, the solution must contain ascorbic acid (0.5 g per 100 ml). The gel-containing medium with the antiseptic complex added to it is then cooled down to $37\,^0$C, prior to its application as conservative.

When β-propiolactone is used for sterilization, 4.5 to 5.2 g per 100 ml of sodium hydrophosphate (Na_2HPO_4) is added while the gel is being prepared (boiling). Afterwards the medium is cooled down to 37 °C when gelatine, and to 40 °C when agar has been used. Then β-propiolactone is added up to a 1.5% concentration.

Now the medium is ready for usage. Preparation of the tisue grafts itself is simple: The grafts, which have been placed in a container, are embedded up to its edge in the thoroughly stirred and cooled (down to 37° or 40 °C) gel-containing and sterilizing medium without observance of aseptic principles, and then hermetically sealed. Sterilization is effected at temperatures between 2° and 5 °C within 24 hours. The thus sterilized tissue grafts are stored in the same medium both in a refrigirator (2—5 °C) or at room temperature (18—20 °C). The time of storage depends on the conservative and antihistamine (pipolphen) used. It has been ascertained by experiment that, when No 9 TSOLIPK solution with pipolphen has been used, tissue grafts embedded in gel-containing media at 5 °C should not be stored longer than five to six months, and at 20 °C no longer than one month. However, the optimal time of storage lies at three to four months for the temperature of 5 °C and 15 to 20 days for storage at 20 °C.

Method 3: Sterilization of the tissue grafts is carried out in a chamber with gaseous aethylene oxide, and conservation by freezing at —25 °C. The method has been elaborated at the laboratory and is, in the author's opinion, one which has the best perspective, particularly when large amounts of tissues are to be prepared. Sterilization of tissue grafts with gases is best carried out under special apparatus which permit control of parameters, such a pressure and temperature. The apparatus, presented here by the author (author's certif. 249 566 of 22 July, 1968), consists of the following basic parts (fig. 2): the hermetic chamber (1), the vacuum pump (2) and the cooling unit (3) with the vaporizer (4). Mounted in the wall of the chamber are: the electric heater (6), the vacuum manometer (7), the contact thermometer (8) and two valves (9 and 15) through which aethylene oxide and carbon dioxide are supplied to the chamber, the latter after passage through the candletype bacterial filter (5).

The device may serve three different modes of sterilization: 1) at a temperature in the chamber of 37 °C and a pressure of 0.5 kg/cm², exposure (i. e., sterilization) requires two hours; 2) at a temperature of 18° to 20 °C and a normal pressure, sterilization takes four hours; and 3) at a temperature of 2° to 5 °C and a normal pressure, sterilization takes 24 hours. As can be seen from the above, the first mode provides for sterilization at body temperature and increased gas pressure, the second at room temperature and normal atmospheric pressure and the third at a cooling temperature. In all three instances, aethylene oxide is used as sterilizing agent, which is supplied to the chamber at 0.8 g/l. This dosage has been tested experimentally and only for the sterilization of homo- and heterologous grafts taken from cadavers without observance of aspetic principles. The procedure of sterilization is as follows: The containers with the non-sterile tissue grafts are closed with plugs of cotton

wool in gauze or of other material permeable for aethylene oxide, and then placed in the chamber from which air is sucked out. Then aethylene oxide gas is introduced to the chamber, the temperature and pressure are set to the required levels (the latter by addition of carbon dioxide to the chamber), and the time is registered. After sterilization has been completed, the gas removed from the chamber by sucking it out with the vacuum pump and letting it escape into open air, and the chamber is filled again with carbon dioxide before it is finally opened. The containers with the tissue specimens, originally taken under non-sterile conditions, are now hermetically fitted with rubber or polyaethylene caps and sealed with paraffin. Furnished with registration cards, these grafts are stored at —25 °C for six months. Insudet away and at this stage storage no aseptic principles need be observed, because the grafts are only taken out of the container just before they are needed for clinical purposes.

After sterilization by the three methods described above, some specimens are sent to the bacteriological laboratory; tests for sterility are carried out in the usual way.

In conclusion, it should be stated that the methods of procuring tissue grafts, as described above, are only equal to other methods with regard to their bactericidal properties; they all ensure 100% sterility provided no errors have been made in their execution. As far as their practical employment is concerned, the first and second method are simple and more generally accessible than the third. They can satisfy the requirements of establishment which prepare and use up a relatively small amount of these grafts. The first method proved its value in the preparation and conservation of homologous skin. When sterilized, the skin graft becomes impregnated with the antiseptic complex and acquires itself antiseptic properties. The second method is very suitable for tissue grafts to be transported over long distances under ordinary conditions. However, when large amounts of tissue grafts are to be prepared, preference ought to be given to the third method. It has particularly been appreciated, because it permits sterilization at low temperatures, which leads to a better preservation of properties within the grafts whose presence ensures success of the transplantation.

It would, of course, not be proper to recommend the above methods of tissue preparation, unless they had proved their value by experiment and in clinical practice. Without referring to the results of experiments, the author would only like to state that, at the period between Jan., 1962 and Jan., 1970, the laboratory distributed to clinics a total of 4445 tissue grafts (bone, cartilage, skin, dura mater, tendon, etc.) prepared by sterilization with chemical means; 2906 of them were sterilized in solutions (i. e., by the first method), 746 with gel-containing sterilizing substances and 793 by gas-sterilization using the third method described above. Analysis of clinical results is not the task of this communication but, nevertheless, the above figures speak for themselves; they bear witness of the wide possibilities for the methods of tissue graft preparation under non-sterile conditions.

CONCLUSIONS

1) The employement of methods which exclude the need for keeping to the principles of asepsis during preparation of homo- and heterologous tissue grafts, have greatly simplified the procedure and made it more economical.

2) The methods of procuring tissue grafts presented are reliable from a bacteriological point of view and permit preparation of tissues under any conditions.

3) The employment of these methods in practice does not change the morphological and biological properties of the grafts, which permits them to be successfully used for plastic operations.

SUMMARY

The author presents three methods of preparation of tissue grafts without observance of the principles of asepsis. Conservation of the specimens is then carried out by cooling in liquids or gel-containing media or by freezing at —25 ^{0}C; sterilization, on the other hand, by an antiseptic complex, β-propiolactone or gaseous aethylene oxide. The described methods permit preparation of tissue grafts under any conditions, thus greatly simplifying the entire procedure and making it more economical. All three methods are reliable from a bacteriological point of view, and do not change the morphological and biological properties of grafts, thus making it possible to use the tissue in clinical practice.

RÉSUMÉ

Quelques - uns des modes de préparations et de conservations des transplants des tissus sans tenir garde de l'asepsie

V. I. Saveliev

L'auteur présente trois manières comment gagner et préparer les transplants des tissus sans tenir garde de l'asepsie. La conservation est pratiquée à l'aide de congélation soit dans les liquides, soit dans les gèles ou bien encore à l'aide des températures de minus 25 degrès de Celsius. La stérilization est pratiquée par le complexe antiseptique, soit beta-propriolactone soit ethylène-oxide gazeux. Les modes décrits permettent de pratiquer la préparation et la conservation des tissus sous n'importe quelles conditions. Ainsi, tout le procès devient plus simple et plus économique. Tous les modes décrits sont saufs à l'égard de la bactériologie changent pas les qualités morphologiques ni celles biologiques et c'est pourquoi ils peuvent être employés avec de bons résultats dans la clinique.

ZUSAMMENFASSUNG

Einige Präparations- und Konservierungsverfahren für Gewebepfropfen ohne Rücksicht auf die Asepsis

V. I. Saveljev

Der Autor beschreibt drei Verfahren für die Gewinnung und Zubereitung von Gewebepfropfen ohne Rücksicht auf die Asepsis. Die Konservierung erfolgt hierbei entweder durch Kühlung in Flüssigkeiten oder Gelen oder durch Tiefkühlung bei

—25 °C, die Sterilisierung erfolgt jedoch mit einem antiseptischen Komplex, Beta-Propriolakton oder Äthylenoxid in Gasform. Die erwähnten Verfahren machen es möglich die Präparation und Konservierung der Gewebe unter jeglichen Bedingungen durchzuführen. Dadurch wird das ganze Verfahren vereinfacht und ökonomischer gemacht. Alle drei Verfahren sind vom bakteriologischen Standpunkt sicher, ändern weder die morphologischen noch die biologischen Eigenschaften der Pfropfen und können infolgedessen in der klinischen Praxis mit Erfolg angewandt werden.

RESUMEN

Algunos modos de la preparación y los de la conservación de las grietas de tejido sin tomar en consideración la asepsis

V. I. Savelyev

El autor presenta tres modos de la obtención y de la preparación de las grietas de tejido sin tomar en consideración la asepsis. Al mismo tiempo ejecuta la conservación sea por el refrescamiento en los líquidos o en las gelatinas, sea por la refrigeración en —25 °C, pero la esterilización realiza por el complejo antiséptico, por beta-propriolacton o por óxido flúido del etileno. Los modos descritos permiten realizar la preparación y conservación de los tejidos en cualesquiera condiciones. De esta manera todo el procedimiento se hace más simple y llega a ser más económico. Los tres modos son seguros bajo el respecto bacteriológico, no cambian ni las propiedades morfológicas ni biológicas de las grietas y por eso pueden aplicarse con buen suceso en la práctica de clínica.

REFERENCES

1. **Ryzhkov, S. V., Kuleshov, Yu. Ya., Siroko, I. A., et al.:** Preparation and Employment of Fibrinolytic Blood and Cadaver Tissues, Leningrad, 1966.
2. **Tkachenko, S. S.:** Homologous-bone Plasty in Traumatology and Orthopaedics, Leningrad, 1966.
3. **Chalmers, J., Hyat, G. V., et al.:** Freeze-Drying Symp., London, 1958.
4. **Hyat, G. W., Turner, T. C., Basset, C. A. L., et al.:** Postgrad. Med., 12 : 239, 1952.
5. **Turner, T. C., Basset, C. A. L., Pate, J. W., et al.:** J. Bone Jt Surg., 38-A : 862, 1956.

V. I. Savelyev, Dr. Med. Sc., Vatutina 31/1, flat 11, Novosibirsk-64, U.S.S.R.

Medical Faculty of Hygiene, Charles University, Prague (Czechoslovakia)
Histologic Laboratory of the Clinic of Plastic Surgery
Head of Clinic Prof. H. Pešková, M. D., DrSc.

HISTOLOGIC EXAMINATION OF SKIN GRAFTS STORED AT +4°C

E. BĚHOUNKOVÁ

The surgeon uses in clinical practice not only fresh grafts, but also grafts which had been stored under various conditions for a certain period after removal.

Quite a number of methods of storage, namely at lower temperatures and in different media, has been worked out. The most comprehensive description of the different possibilities and methods of storage was rendered by Klen (1957). The storage of grafts is connected with the problem of tissue viability, i. e. the determination of the period of storage in which the tissue still maintains fully its biological value.

Several methods have been applied in order to ascertain the viability of grafts: cultivation of stored grafts was carried out for ex. by Allgöwer and Blocker (1952), McCormack (1957). Reggrafting was applied by Flatt (1950), Medawar (1954), Allgöwer and Blocker (1952), Pepper (1954), Calnan and Innes (1957), Lehr et al. (1964) and Šmahel and Nejedlo (1966). Santoni-Rugio (1962, 1968) evaluated the viability of grafts by determining the oxygen consumption. The mentioned methods were accomplished sometimes by histologic examination.

The most often applied method of tissue storage carried out at our Clinic, is the storage of skin grafts at a temperature of +4 °C in a wet chamber. The task of the first part of our report was the histologic evaluation of changes, which occur in the tissue during storage in a wet chamber at a temperature of +4 °C.

MATERIAL AND METHODS

In the histologic examination, 21 thin dermo-epidermal grafts were used. They were obtained from 21 burned patients.

Parts of the removed grafts were stored in a wet chamber at a temperature of +4 °C. Samples from grafts stored under these conditions were collected within a time period of 1—30 days.

The samples were fixed for 48 hours in 10% neutral formalin. Then the material was embedded in paraffin in the usual way and cut on a rotating microtome to sections of 5—7 micrometer thickness.

The sections were stained by the following methods: Hematoxylin-eosin-saffron, staining according to van Gieson, Saturn red according to Holuša (1968) for collagen fibers, impregnation according to Gomori for reticular fibers, Aldehydefuchsin and orcein for elastic fibers, Feulgen's nuclear reaction, melanin proof according to Masson, Alcian blue for acid mucopolysaccharides and PAS for neutral mucopolysaccharides and glycogen.

The method according to Gram was orientatively applied in order to demonstrate bacteria in the sections.

RESULTS

The histologic examination of grafts obtained for the studies, disclosed that the grafts are composed of epidermis and of the papillary layer of dermis (Fig. 1). In single cases the grafts also contained a small part of reticular layer.

Up to three days of storage the histological examination afforded results which were identical with those obtained in examination immediately after removal.

Starting on the third day there appear the first slight changes in the epidermis. In the cells of the stratum Malpighii we ascertain perinuclear hydropic changes characterized by the forming of a light zone around the nucleus. In the upper layer of the stratum spinosum adjacent to the stratum granulosum, starts a flattening of the polyedric cells without formation of keratohyalinic granules. Simultaneously the horny layer broadens and the superficial layers are freed and separated. The rest of glycogen in the epidermis cells could be trapped only in one case after three days of storage. We ascertained no changes in the first week in the connective tissue part of the graft.

Around the seventh day the above described changes in the epidermis are already more distinct. The incidence of perinuclear hydropic changes is already more frequent. Some nuclei show pyknosis (Fig. 2), others striking deformations. The nuclei take on half-moon shape and they are pressed to the rim of the vacuole, taking up the greater part of the cell. The number of layers of flattened cells in the stratum spinosum also increases. At that time changes start to appear also in the corium. Slight pyknosis of the nuclei occurs. The fine collagen and reticular fibers under the epidermis are less sharply outlined and form denser fusing spatial nets. This finding is of progressive character and around the twelveth day it is mostly already very striking (Fig. 3). In this time interval we also observed the first signs of separation of the epidermis from the corium (Fig. 4). The cells of the basal layer loose their contours, the borders between the cells disappear and cracks appear between epidermis and corium.

After three weeks of storage we ascertain — besides the reported changes in the epidermis often already its total separation from corium. On the bare corium the basal membrane is usually visible in the start and disappears in the

later stages. The elastic and strong collagen fibers show no changes during storage. Interesting were the changes in the melanin pigment, its occurance in the basal layer of epidermis, increased during storage. At first the pigment granules were fine, later they fused into coarse granules. The occurrance of mast cells was less frequent as the time interval lengthened, sometimes we only observed agglutinations of granules.

In the orientative bacteriologic examination, the occurrence of gram+cocci was observed in one case after eight days of storage.

DISCUSSION

The histologic examination disclosed the gradual development of degenerative changes in the graft. Most changes we ascertained in the epidermis. In the Malpighian layer there occurred perinuclear hydropic degeneration, flattening of the polyedric cells without occurrance of keratohyaline granules, broadening of the horny layer and later separation of the epidermis from the corium. The glycogen rest could be only retained in the Malpighian layer of the epidermis in a single case after three days of storage. The melanin amount increased during storage. This increasing amount of pigment was studied separately in each graft because it was essential to exclude individual and local differences of skin pigmentation.

Changes in the corium were less striking. In the papillary layer the drawing of collagen and reticular fibrils became denser, they fused into a dense net. This is probably the consequence of the decreased water contents in this layer of connective tissue. The arrangement of the collagenous fibres and bundles and of the elastic fibres in the deeper corium layers did not change during the entire studied period. In a later period the changes on the nuclei of the connective tissue cells were more visible in the sense of pyknosis. Mast-cells which we found at different numbers in the initial stage, decreased after three weeks of storage. They quite often disintegrate and occurred as groups of fine granules.

Our findings are comparable with the evaluation of histologic changes in the report by Klen (1957) who studied the degree of necrobiosis and autolysis of cornea. The decrease of cells in the malpighian layer of epidermis and the increase of the horny layer agrees with the observations by Flatt (1950) on human skin grafts. The finding that no pathologic changes appear in grafts up to three days, may be compared with results which were achieved by Šmahel and Nejedlo (1966) in experiments with regrafting cooled skin in rats. The separation of the epidermis from the corium began in our material between the second and third week of storage. Vrabec (1956) observed in clinical practice that grafts stored at a temperature of $+4\,^{0}C$ up to three weeks take well in some cases. For the time being we are unable to explain the increase of melanin during storage.

Certain differences in the development of degenerative changes ascertained between the individual grafts we explain by the different quality of the donor site and the general condition of the patients.

From the obtained results the conclusion can be drawn that histologic examination by itself is a less suitable method for assessing the changes occurring in graft stored at a temperature of +4 °C. Medawar (1954) arrived at a similar conclusion. We believe however that histologic examination combined with histochemical examination with which we are dealing in a further study might afford more precise information.

The results of histologic examination tend to indicate in accordance with the observations of other authors that storage of grafts up to seven days at a temperature of +4 °C does not change their morphologic structure profoundly. After this period, the degenerative changes intensify and may affect the take of the graft unfavourably.

SUMMARY

Histologic examination of skin grafts stored at a temperature of +4 °C in a wet chamber, disclosed that morphologic changes occur, starting on the third day. In the first week, the degenerative changes are of a lesser degree, on the twelfth day they are already more distinct. The changes are however not characteristic enough for using the histologic examination as an objective criterium for assessment of the viability of grafts and their suitability for transplantation.

RÉSUMÉ

Une recherche histologique des transplants cutanés conservés à la température de +4 degrès de Celsius

E. Běhounková

Une recherche histologique des transplant cutanés conservés à la température de +4 degrès de Celsius dans un milieu humide a montré des changements morphologiques dès le troisième jour. Dans la première semaine, les changement dégénératifs sont bien petits, mais, à partir du douzième jour, ils devient plus importants. Pourtant ces changements ne sont pas si charactéristique pour que la recherche histologique elle-même puisse servir en tant que donnée objective pour classer la vitalité du transplant et sa possibilité de transplantation.

ZUSAMMENFASSUNG

Histologische Untersuchung der bei +4 °C aufbewahrten Hauttransplantate

E. Běhounková

Die histologische Untersuchung der bei +4 °C in feuchter Kammer gelagerten Hauttransplantate hat gezeigt, dass morphologische Veränderungen vom dritten Tag an auftreten. In der ersten Woche sind die degenerativen Veränderungen von geringfügigem Grade, am zwölften Tag sind sie bereits ausgeprägter. Die Veränderungen sind jedoch nicht so charakteristisch, dass die histologische Untersuchung allein als ein objektives Kriterium zur Beurteilung der Vitalität des Pfropfens und seiner Eignung zur Transplantation benützt werden könnte.

RESUMEN

Reconocimiento histológico de los injertos de piel almacenados en la temperatura de +4 grados C

E. Běhounková

El reconocimiento histológico de los injertos de piel almacenados en la temperatura de +4 grados C en un cuartito húmedo indicó, que los cambios morfológicos suelen llegar a partir del tercer día. En la primera semana son los cambios de degeneración del grado menor, el día duodécimo son ya más expresivos. Pero los cambios no son tan característicos, para poder emplear el reconocimiento histológico mismo como el criterio objetivo para apreciar la fuerza vital del injerto y su conveniencia para la transplantación.

REFERENCES

1. **Allgöwer, M., Blocker, T. G.:** Tex. Rep. Biol. Med. 10 : 3, 1952.
2. **Calnan, J., Innes, F. L. F.:** Brit. J. plast. Surg. 10 : 11, 1957.
3. **Flatt, A. E.:** Brit. J. Plast. Surg. 3 : 28, 1950.
4. **Holuša, R.:** Čs. Pathol. 3, 3 : 190, 1968.
5. **Klen, R.:** Odběr a konservace tkání, Praha SZN, 1957.
6. **Lehr, H. B., Berggren, R. B., Lotke, P. A., Corriell, L. L.:** Surgery 56 : 742—746, 1964.
7. **Medawar, P. B.:** Proc. roy. Soc. Med. 47, 62—64, 1954.
8. **McCormack, R. M.:** Plast. reconstr. Surg. 19, 483—487, 1957.
9. **Pepper, F. J.:** Brit. J. plast. Surg. 6, 250—256, 1954.
10. **Santoni-Rugiu, P.:** Plast. reconstr. Surg. 30, 586—594, 1962.
11. **Santoni-Rugiu, P.:** Storage of skin and homografts. Present clinical aspect of burns, Symposium, Maribor 1968.
12. **Šmahel, J., Nejedlo, V.:** Sborník věd. prací LF KU v Hradci Králové 9, 2 : 155, 1966.
13. **Vrabec, R.:** Výsledky transplantací u popálených. Reported at the Seminar of the Clinic of Plastic Surgery, Praha 1956.

Dr. E. Běhounková, Praha 2, Legerova 63, Czechoslovakia

Radiological Clinic,
Faculty of General Medicine of the Charles University
Head prof. V. Šváb, M. D. DrSc.
Isotopic Laboratories, Biological Institutes of the Czechoslovak Academy of Sciences
Head doc. K. Vereš, M. D. CSc.
Faculty of Hygiene of the Charles University, Clinic for Plastic Surgery
Prague (Czechoslovakia)
Head prof. H. Pešková, M. D. DrSc.

SYSTEMIC EFFECTS OF BURNS ON BONE MINERAL METABOLISM

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

Among systemic responses in burns, the effects on bone mineral metabolism still remain widely unknown both in the clinical practice and in experiments on animals (Doleček et al. 1969; Cuthbertson 1970; Jelenko 1970). In our previous papers we have summarized some of our experiments with male Wistar rats suffering from thermal injuries (Kolář et al. 1962, 1965, 1966), from Laser injury (Kolář et al. 1969) as well as from different physical agents including mechanical force (Babický and Kolář 1965; Kolář et al. 1965). Systemic deviations in the uptake of ^{45}Ca have been present in the whole skeleton of experimental animals.

The intensity and course of the generalized metabolic answer is given by the art and age of the animal and the art and intesity of the damaging agent. The abscopal effects are governed by neuro-humoral mechanisms as proven in experiments with radiation induced damages (Kolář et al. 1965). From both the clinical and experimental view the question is important whether there are any differences of this reaction in both sexes; this could be one part of hormonal regulative mechanisms. Hormonal regulations of systemic reactions in burns could also be of great clinical interest with respect to their prophylaxis and therapy. Some sexual differences could be found previously in experiments with radiation induced damages (Babický and Kolář 1970). In adult female rats e. g. the weight of dried bone substance as well as the whole content of calcium were increased after local X-ray injury, whereas in female rats before sexual maturity and in all male rats these values did not reach the normal limits. We have thus decided to examine the differences of generalized metabolic skeletal answer in burned rats of both sexes.

METHODS

Adult female and male Wistar rats (strain Konárovice) two months old have been used. A 1 per cent of body surface burn was caused by putting an iron heated on 350 ^{0}C for five seconds to the right knee area under the patella. The burns healed in about ten days without remarkable alteration of the general condition of the animals. There have also been no deaths during the experimental period which covered

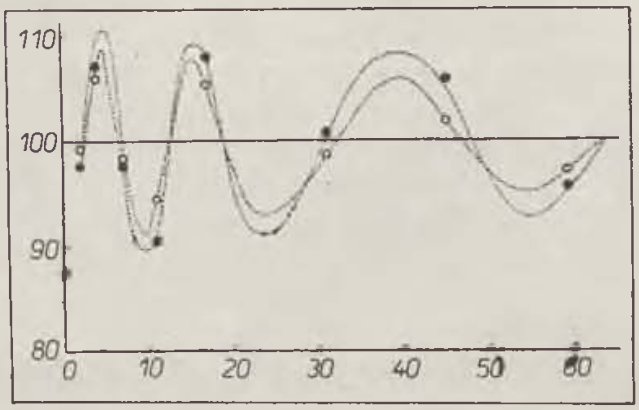


Fig. 1 Hypothetical course of comparative weights of dried tibial bones to body weight of experimental animals, expressed in per cent of healthy animals' weights. Male rats. ● Burned bones in per cent of controls; ○ opposite mones in per cent of controls. Ordinate: days of experiment. Abscissa: per cent

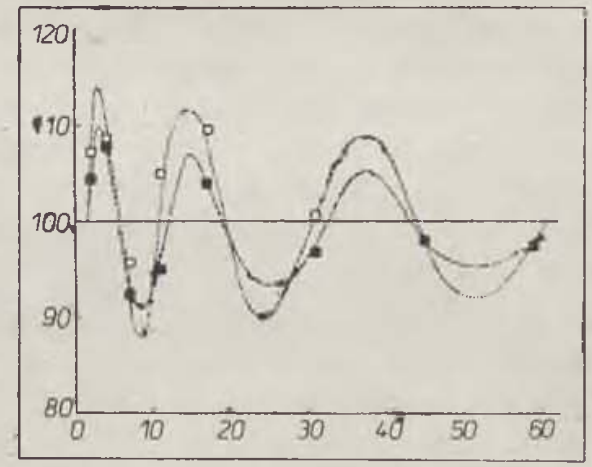


Fig. 2. The same data as in Fig. 1, for female animals

sixty days after the burn. Parallel with burned animals healthy controls have also been kept under the same conditions. Immediately after the burn and thereafter on the days 2, 5, 9, 15, 29, 43 and 57 five animals from all groups (experimental males and females, healthy males and females) have been injected subcutaneously with 10 μCi ^{85}Sr and 20 μCi ^{45}Ca (both as chloride) in isotonic saline. After 48 hours the animals were weighed and their activity has been measured with a whole-body counter. Thereafter they have been killed by overdosage of ether narcosis and the tibia of the injured and non-injured leg has been removed and cleaned off from soft parts. The ^{85}Sr-content in the whole tibia was then measured with a NaI(Tl) hole-cristall and a Tracerlab

counter. Thereafter the bones have been burned in a muffle furnace, their ashes have been individually weighed and dissolved in aliquote parts of HCl and their calcium was precipitated as an oxalate and filtered in a demountable filtration apparatus. After destinations of radioactivity in individual samples the calcium content has been destined manganometrically (more detailed description of all methods see in Kolář et al. 1965). The activity of both ^{45}Ca an ^{85}Sr and thereafter of ^{85}Sr separately has been measured with a GM-counter and a thin mica window in all probes. The content of ^{45}Ca was the difference between both these results after appropriate corrections. The values have been expressed as averages from results of measurements of all five samples, investigated in individual groups of these animals.

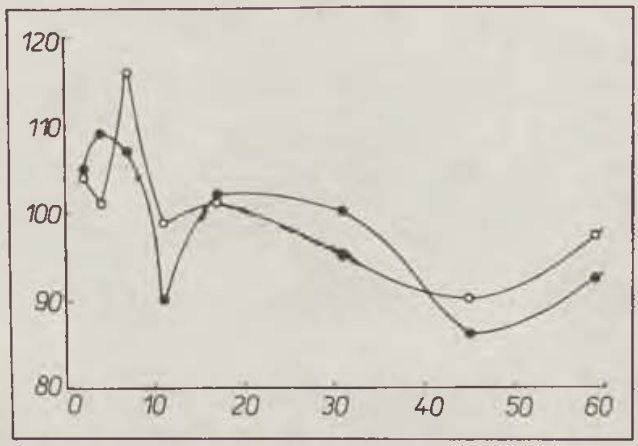


Fig. 3. Percentual uptake from delivered ^{45}Ca-dosis in the burned ● and opposite ○ tibia of male rats. Healthy animals = 100 per cent. Ordinate: days of experiment. Abscissa: per cent

RESULTS

The body weights of experimental animals varied only slightly and within statistical limits. But the differences in the weights of dried tibial bones have been more evident in both male (Fig. 1) and female animals (Fig. 2). They are expressed here as relative values: the weights of dried bones to body weights of experimental animals if the values in healthy controls are considered as 100 per cent. In both diagrams the oscillating changes in the weights of dried tibial bones are a striking feature, both in the injured as well as in the non-injured bones. The oscillations are somewhat different in both sexes. In males the oscillating tendency is more expressed in injured bones, in females in the non-injured legs.

In the diagrams 3 and 4 the 48 hr ^{45}Ca-uptakes in the whole tibia have been expressed again for male and female animals in relation to the uptakes in healthy controls (= 100 per cent). In males (Fig. 3) there was a transient initial overshoot of the uptake, more expressed in the opposite leg; the uptake in the injured bone on the contrary decreased more on the 11th day, as in the opposite leg. Thereafter the oscillation and depression came again and lasted up to the end of the experimental period; it was more evident in the injured

leg. In females the initial increase was even higher than in the males but thereafter the whole course showed less variations and oscillations than in males (Fig. 4).

The curves of the ^{85}Sr-uptake in the whole tibia took a similar course and therefore it is not necessary to document them in detail. The statistical significances of these data are as follows:

Tab. 1

Day	Males		Females	
	Opposite Tibia	Injured Tibia	Opposite Tibia	Injured Tibia
2	$> 0,05$	$> 0,05$	$> 0,05$	$> 0,05$
4	$> 0,05$	$> 0,05$	$< 0,01$	$< 0,05$
7	$> 0,05$	$> 0,05$	$< 0,05$	$< 0,01$
11	$> 0,05$	$< 0,05$	$> 0,05$	$< 0,01$
17	$< 0,001$	$> 0,001$	$< 0,05$	$< 0,05$
31	$< 0,001$	$< 0,001$	$> 0,05$	$> 0,05$
45	$< 0,001$	$< 0,001$	$> 0,05$	$> 0,05$
59	$< 0,05$	$< 0,05$	$> 0,05$	$> 0,05$

There are also some interesting differences in the relations of ^{85}Sr to ^{45}Ca uptakes in injured and opposite bones in the males (Fig. 5) and the females (Fig. 6). Again the relations are different both with time and leg and the sex of the animals. In general the depression is greater and long-lasting in males when compared with females. In females instead of a depression a transient elevation is visible at the day 31 and thereafter the values tend to normalize or decrease slightly when compared with healthy controls.

COMMENT

The general results of this experiment allow several conclusions.

(1) The presence of an oscillating systemic answer in the mineral metabolism in the skeleton is evident in the rats suffering from a localized burn. *Abscopal* effects of burns have mostly been investigated in the clinical practice with respect to other organs and systems than in the bones. The main reason is that the skeletal system of a patient is not easily accessible for such investigations without difficult metabolic procedures. The prove of a metabolic shift in the skeleton can help to elucidate the existence of decalcinations in burned patients. They are sometimes seen radiographically if the losts exceed 30 to 40 per cent or more of the previous mineral content of the bone.

(2) The cause of this metabolic shift is certainly not only an intoxication caused by toxines released from injured body tissues. The excellent general condition of the animals suffering from such limited burns support this feeling. Also in other physical agents than in burns (e. g. in fractures) no toxic conditions can be made responsible for the generalized metabolic shift which also appears in the whole skeleton (Kolář et al. 1965). The course of such abscopal

reactions resembles more a trial to remove the sequelae of the local injurious action in the bone. Because there are no mechanisms which could limit the regulative action on the damaged area only, simultaneously also changes in the non-injured area and other skeletal parts start. Such over-reactions in reverse cause abnormal conditions which have to be normalized by some opposite action. In this way the alternating reactions can be explained which lead to oscillating course in the uptake of the bone-seeking radioactive tracer.

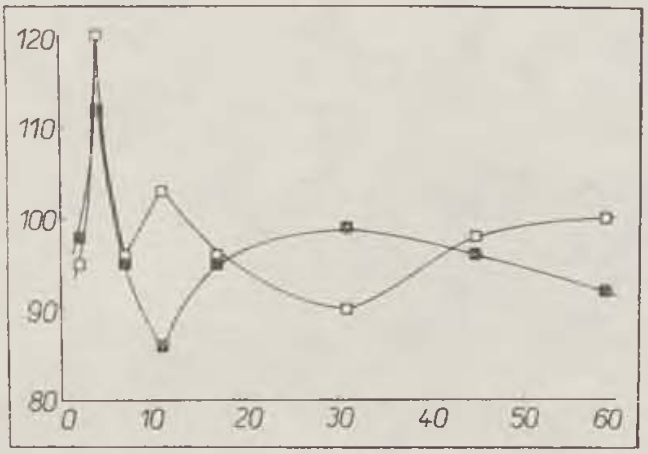


Fig. 4. The same data as in Fig. 3, for female rats

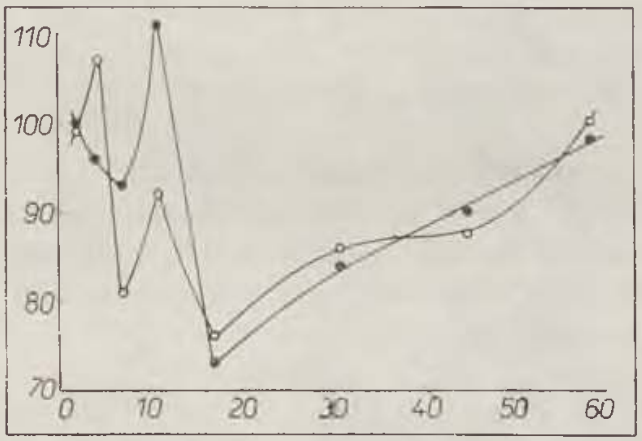


Fig. 5. Relation of ^{85}Sr to ^{45}Ca uptake in the burned ● and opposite ○ tibia of male rats expressed in per cents from the delivered dosis. Healthy animals = 100 per cent. Ordinate: days of experiment. Abscissa: per cent

(3) The comparison with the reaction caused by other damage, e. g. by X rays (Kolář et al. 1965; Babický et al. 1970) shows some differences in burns. Thus this reaction also depends on the art of the physical agent which is easily understandeable in the X rays because of the peculiar kind of their interaction with the living matter. But also different intensity of X rays and different dosages (Kolář et al. 1965) as well as different extents and depths of burns

(Kolář et al. 1962) cause proportionally more or less pronounced generalized answer. Certainly some threshold dose does exist which must be exceeded in order to initiate this metabolic reaction. We have not tried to find it and also the question remains open whether in very extensive and deep damages the reaction is not deeply influenced by devitalization of the tissues and perhaps again less pronounced.

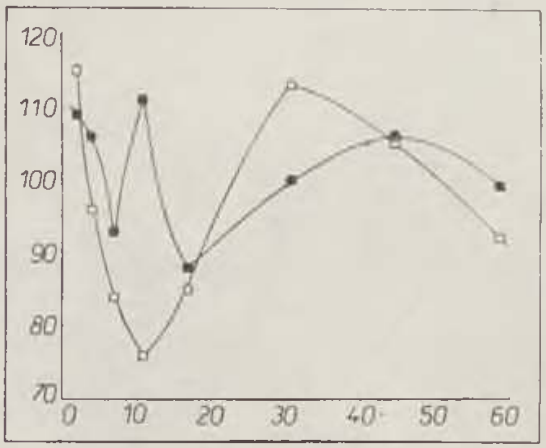


Fig. 6. The same data as in Fig. 5 for female animals

(4) Like in the experiments with X rays the course and the intensity of the reaction in female and male animals is different. Such repeated differences support the presumption that this fact is a biological law. The female animals seem to be either more resistant against the harmful agent of the same energy or to have a better restorative capacity, than the males. This difference reflects in an indirect way the influence of hormonal regulations on the generalized metabolic answer.

(5) The over-shooting and depressing oscillations have a certain intensity and frequency (see Figs. 1 and 2). The prolongation of the waves and their decrease is an expression of their damping which must ultimately lead to full normalisation of the mineral metabolism in the bones. Here again, there are differences in the intensity as well as in the periodicity of the waves. In females the course is more moderate. At present there is no explanation for the different oscillations in injured and opposite tibias of experimental animals and of the fact that in males the values in opposite tibias show higher oscillations than the contralateral, whereas in females the opposite is true. But in general, the oscillating course of this reaction, as expressed here, resembles the course of radiation induced erytheme in the skin and other biological rhytms.

(6) The differences in the uptake-relations of ^{85}Sr to ^{45}Ca also reflect the intensity of rebuilding of the bone tissue. Under normal conditions the uptakes of both isotopes take a parallel course. In pathologic rebuildings of bones the uptake of ^{85}Sr is discriminated in favour of ^{45}Ca and thus lower (Schraier 1963). This discrimination is clearly seen in the Figs. 5 and 6 at several moments. It also documments the alternating stages of rebuilding of bone tissues with time.

This experiment thus shows the existence of a whole-skeletal metabolic answer to burns in young rats and the difference given by the sex of the animals. It helps to open the interesting problem of mineral shifts in the skeleton which are still not accessible for investigation in the clinical practice.

SUMMARY

After previous experiments the presence of generalized metabolic mineral response in the skeleton has again been confirmed in localized burns. The reaction take a different course in male and female animals and is less expressed in females. Here it also shows an earlier tendency for normalization. The evidence of such metabolic answer will perhaps help to explain the mechanisms of demineralizations of the skeleton and heterotopic calcifications in burned patients.

RÉSUMÉ

L'influance systématique des brûlures sur le métabolisme dans les os

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

En suite des expériments précédant les auteurs ont de nouveau trouvé présence d'une réponce total du métabolisme minéral dans le squélet des animaux soumis à la brûlure. Cette réaction diffère chez les mâles et les femelles étant bien moins remarquée chez les dernières. Ici, elle se trouve bien souvent plus prête à retourner aux données normalles. La présence de cette réponse métabolique nous permet d'expliquer le méchanisme de déminéralisation des os et de la calcification hétérotopique chez les brûlés.

ZUSAMMENFASSUNG

Systemeinfluss der Verbrennungen auf Knochenmineralmetabolismus

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

Nach vorhergehenden Versuchen wurde auch bei begrenzter Verbrennung erneut die Existenz einer generalisierten metabolischen Antwort im Mineralaustausch bestätigt. Diese Reaktion verläuft unterschiedlich bei männlichen und weiblichen Tieren und ist bei weiblichen weniger auffalend; sie zeigt bei ihnen auch eine deutlichere Tendenz zur Normalisierung. Das Studium dieser metabolischen Antwort wird vielleicht helfen, die Demineralisationsvorgänge und Bildung von heterotopen Verkalkungen bei Verbrennungen zu klären.

RESUMEN

Influencia de sistema de las quemaduras al metabolismo mineral en los huesos

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

Después de los experimentos anteriores fue comprobada de nuevo la presencia de la repercusión mineral total en el esqueleto de los animales con la quemadura local. Esta reacción pasa diferentemente en los machos y en las hembras y se expresa menos en las hembras. Aquí también manifiesta la tendencia más temprana a la normalización. La presencia de esta repercución de metabolismo posiblemente ayudará explicar el mecanismo de la desmineralización del esqueleto y las calcinaciones heterotópicas en las personas quemadas.

REFERENCES

1. **Babický A., Kolář J.:** Generalized Response of Calcified Mammalian Tissues to Local Injury. Physiol. Bohemoslov. 14, 1965, 3 : 173.
2. **Babický A., Ošťádalová I., Kolář J., Pařízek J.:** Geschlechtsbedingte Unterschiede der Allgemeinreaktion. Strahlentherapie 139, 1970, 2 : 203.
3. **Cuthbertson, D.:** Metabolic Response to Injury. Brit. J. Surg. 57, 1970, 10 : 718.
4. **Doleček R., Endryáš L., Kalina J., Klabusay L., Tichý A.:** Metabolic Response of the Burned Organism. C. Thomas, Springfield 1969.
5. **Jelenko C.:** Systemic Response to Burn Injury. J. of Trauma 10, 1970, 10 : 877.
6. **Kolář J., Babický A.:** Whole-body Skeletal Metabolic Response on Local Skin Burns. Nature 1962, 1107.
7. **Kolář J., Babický A., Blabla J.:** Some Effects of Laser upon the Bones. Experientia 25, 1969, 4 : 365.
8. **Kolář J., Babický A., Vrabec R.:** The Physical Agents and Bone. Praha, Academia 1965.
9. **Kolář J., Babický A., Vrabec R., Vyhnánek L.:** Knochenumbauerscheinungen nach Verbrennungen. Arch. orthop. Unfall-Chir. 60, 1966, 3 : 217.
10. **Schraier:** in: R. H. Wasserman (Ed.): The Transfer of Calcium and Strontium across Biological Membranes. Discussion, page 419. New York, Academic Press 1963.

Doc. dr. J. Kolář, DrSc., Praha 2, U nemocnice 2, Czechoslovakia

---

M a t t e r, P., B a r c l a y, T. L., K o n i c k o v a, Z.: **Research in Burns. Transactions of the Third International Congress on Research in Burns, held in Prague, September 20—25, 1970.** H. Huber, Berne, 1971, 730 pages, 250 illustrations, 126 tables, price: SF 198,—, DM 178,—, US$ 44,—.

The Transactions of the Third International Congress of ISBI (International Society of Burn Injuries), held in Prague in September 1970, have been issued in book form by the publishing house H. Huber, Berne, Switzerland. The presentations dealing with the different problems of burns sickness have been arranged into nine chapters. The chapters on the basic problems are introduced by summaries of top research workers, which give a comprehensive picture of the present state of knowledge, as well as point to the problems still unsolved, on which attention of experimental workers should be centred. The first chapter deals with prevention of burns in developing countries and highly civilized countries. Burns represent a great organizational problem for the health services of all countries. The entire group of experimental studies deals with the various aspects of burns sickness. Some chapters dissert on adjacent branches, such as anaesthesia in patients with burns, psychiatric problems, etc. The problems involved in nursing the burned patient are also a most important chapter, because the quality of nursing is decisive for the out-come of the treatment.

The book is comprehensively arranged, printed in good taste, and includes good pictorial documentation. It is an appropriate demonstration of the standard with which the problems arising from this most serious injury are dealt with in the entire world, an effort which has united competent workers of 50 countries in the ISBI. The reader also learns the names of all contemporary research workers in this field. The book has been designed not only for surgeons, plastic surgeons or anaesthesiologists, but also for bacteriologists, physicians, biochemists and research workers. R. V.

Charles University Medical Faculty of Hygiene, Prague (Czechoslovakia)
Clinic of Radiology
Head Prof. R. Bláha, M.D., DrSc.
Clinic of Plastic Surgery
Head Prof. H. Pešková, M.D., DrSc.

OSSEOUS CHANGES IN MIDDLE CLEFTS OF THE NOSE

M. BREJCHA, M. FÁRA

By middle clefts of the nose we understand relatively rarely occurring developmental defects and deformations which affect predominantly the cranial part of the face and skull and adhere to the middle line.

Considerable disagreement exists in literature on their division and classification according to the resulting anatomic condition and according to the probable type of initial developmental disturbance. This may be caused by a wide scale of possible variants of the defect, different opinion on the embryologic data and finally by a small number of cases which were at disposal of the individual authors. For this reason we undertook the task of carrying out detailed skiagraphic examination of a larger number of patients with medial clefts of the nose, possibly contributing to greater accuracy of their classification according to the roentgenological changes of the skeleton.

We directed our attention to osseous changes in those defects which originate from disturbances in the closing of the anterior neuropore (the actual hernia or its remnants) and furthermore to changes in the so called proper middle clefts. They probably form on basis of embryonic hernia cerebri though — contrary to the former mentioned group of cephaloceles — it is actually impossible to prove aberant nervous tissues histologically. We are not including the other types of medial cleft defects in this report. Because we had the possibility to carry out x-ray controls in some patients even for a number of years, we endeavoured to comprise also the developmental tendency of skeletal changes, for ex. the narrowing of the defects by ossification in direction from the rims or the development of nasal sinuses.

MATERIAL AND METHODS

We selected for our group, 26 patients treated at the Clinic of Plastic Surgery in Prague within 1926—1970 for medial cleft of the nose. We either had previous x-ray documentation of the patients at our disposal or we were able

to carry out new or suitably aimed control examination. A number of further former patients at the Clinic is not included in the group because we were not able to contact them anymore.

According to the picture of osseous changes we divided the patients into three groups showing approximately the same signs as follows:

1. frontal cephaloceles,
2. frontonasal herniae,
3. deformities known as proper medial nasal clefts.

Fig. 1a.

1. In frontal hernia and glioma (as dysentogenetic tumor) we find typical dehiscence in the frontal squama. Sometimes it is slit-like, medially placed, possibly with a more dense bony edge, at other times there are somewhat laterally placed, more or less symetrical defects of different size present. The frontal sinuses are often normal, sometimes their development is retarded. The nasal bones are often coarse, deformed, or prolonged, the spina nasalis ant. is strong, upwards protracted. In rare cases the lamina cribrosa is caudally bent. In most of the cases the glabella is normally arched; in a flattened glabella even the angle of the nasal bones is more open. The ethmoids are usually broader, the orbits may be placed at a greater distance, in the sense of light hypertelorism.

We should like to quote as an example the patient T. J. case history No. 11.196 (Fig. 1a) in which sagital view demonstrates extensive radiolucent area corresponding to a large dehiscence in the squama of the frontal bone.

Fig. 1b.

Fig. 1c.

Fig. 2a.

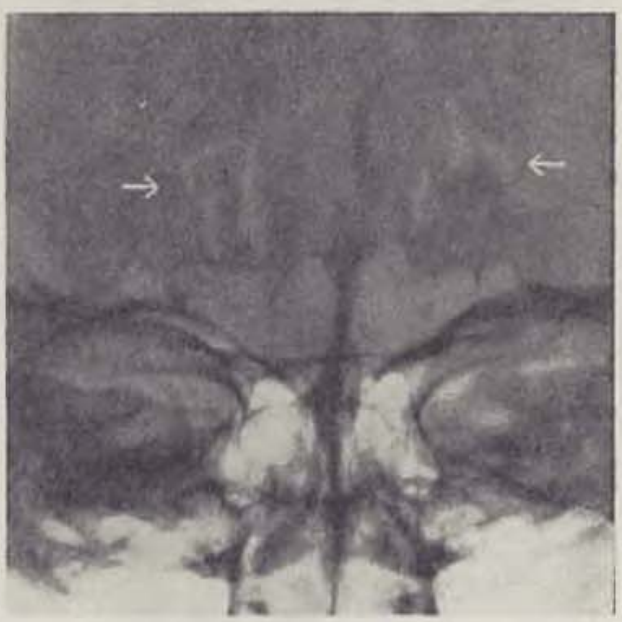


Fig. 2b.

Almost its entire height is affected on the left, it is smaller on the right and both parts of the defect join above the glabella. The frontal suture is preserved (Fig. 1b). Waters' view shows the greater distance of the orbits in the sense of hypertelorism, the ethmoids are wide (Fig. 1c). In lateral view the glabella was flat with significantly caudal inclination of the nasal bones. In the operation the defect in the frontal bone was found to be covered by firm connective tissue membrane, nodules of gliomatous tissue were found under the skin. In the course of further 11 years the defects in the frontal bone became somewhat smaller and there developed atypical pneumatisation of the frontal bone with a wide compact bridge between the right and left sinus.

In a further patient, K. S., case history No. 19.666 (Fig. 2a), the defect, a frontal glioma with bilateral coloboma of the nasal wing — was of a lesser degree. A dehiscence is again evident in the frontal bone, but the region of the nasal root is unaltered and the frontal pneumatisation is also normal (Fig. 2b).

2. The second group consists of f r o n t o n a s a l c e p h a l o c e l e s. Here the osseous defect lies between the orbital cavities which are more distant and protracted into vertical ovals. The medial orbital wall is missing to the extent of the height of the defect through which the hernia protrudes.

The rim of the defect is formed by strong bone ledges. The ethmoid labyrinth is broad and strongly depressed downwards, the nasal cavity is low. The glabella is flat.

Fig. 3a.

Fig. 3b.

Fig. 4a.

Fig. 4b.

Fig. 4c.

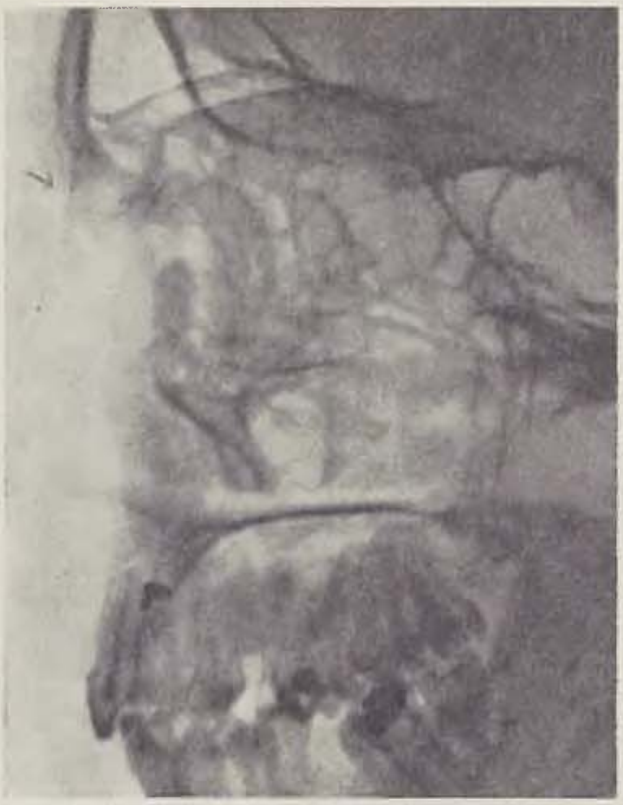


Fig. 5.

Fig. 6.

Adjacent to the upper rim of the defect is a bone shadow reminding of nasal bones. A second shadow similarly orientated is in the ceiling of the nasal cavity itself, however nearer to the nasal tip — as if the nasal bones were transversally divided. In all studied patients (D. J., case history No. 20.319 and E. M., case history No. 57.501) (Fig. 3a, 4a) the picture was strikingly similar in all details (Fig. 3b, 4b, 4c).

3. The third group of patients is formed by the proper so called m e d i a l n a s a l c l e f t s. In general they are marked by a more complicated picture of osseous changes than in both the former groups especially in cases where — in addition to the region of the nose itself — even the alveolar arch or the palate is afflicted by a cleft — though the affliction may be only very slight. A number of changes resembles however the herniae in the former group.

A dehiscence in the frontal squama is only exceptionally present. The glabella is flat. In the majority of cases the nasal bones are vertical, more or less in continuation of the frontal plane. Sometimes they are strikingly large and coarse, being rather small at others times. In several cases we observed in the place of their root an atypical pneumatised cavity (Fig. 5). Spina nasalis anterior is mostly protracted forward and upward, sometimes spur-like (Fig. 6). Proc. frontales maxillae are often strong. Hypertelorism and wide ethmoids is a constant finding and in the more developed defects pneumatisation of the frontal bone is missing or rather atypical. The nasal septum may be thickened and even doubled. The nasal cavity — with a broad nasal

dorsum — is of square shape or in the shape of a gothic double arch. The cribriform plate of the ethmoid is in a number of cases bent downward. Crista galli is sometimes separated.

In this group of patients we can see more often a slight medial cleft of proc. alveolaris with irregular dental arrangement, with defective formation of the palatal vault and with asymmetrical upper jaws.

Fig. 7a.

For illustration we should like to mention patient K. V., case history No. 9.012 (Fig. 7a). In sagital projection there is again striking hypertelorism and both orbits are oval shaped. The nasal cavity, especially in its dorsal part, is wide. Proc. frontales are strong, the septum in the cranial and ventral part forms together with the immerged cribriform plate a fork-like formation with the crista galli without any evident bone attachment. The ethmoids are rather wide. There are practically no frontal sinuses excepting a small bulla from the anterior ethmoids on the left. The palate is gothic, slightly asymmetrical (Fig. 7). On the tomogram in lateral projection the glabella is strikingly flattened; very coarse nasal bones root in steep downward direction. The line of the cribriform plate of the ethmoid is ventrally bent in caudal direction. The base of the nasal cavity on the other hand, is slightly uplifted (Fig. 7c).

A similar picture presents another patient K. M., case history No. 26.583 (Fig. 8a), although the defect was not of such a degree as in the former patient. The orbits do not take on oval shape here, but the distance between

them is greater than usually. The pneumatisation of the frontal bone is more extensive but rather atypical. Crista galli is again of unusual shape (Fig. 8b). Lamina cribrosa shows in lateral projection a depression in ventral direction. Between the incisors there is a diastema of approx. 2 mm width.

DISCUSSION

The group consists of 8 patients with anterior cephalocele, 4 patients with frontonasal localisation of hernia and 14 patients with proper middle cleft of the nose. If these osseous changes are compared, it is evident that in the

Fig. 7b.

Fig. 7c.

first group group the most striking sign are larger or smaller defects in the frontal squama, whereas the splanchnocranial deformations are insignificant. These defects have also the tendency to close up by ossification from the rims. In the lower situated frontonasal hernia, the medial character of the defect is marked most. Hypertelorism is more stressed here, its heaviest degree being nevertheless in the third group. The ethmoids are very wide. The bone structures outlining laterally the defect between the orbital cavities remind of strong and compact proc. frontales maxillae in some patients of the third group. In all three groups there are frequent changes of the nasal bones and the anterior nasal spina mostly in the sense of protraction, atypical inclination and deformation. The caudally bent lamina cribrosa tends to prove the participation of frontal parts of the brain in the formation of the defect. The

Fig. 8a.

Fig. 8b.

ethmoid bone is often affected even in its vertical plate. The deformations of the facial skeleton are more distinct in the third group of our patients than in both the former groups and sometimes represent a considerable obstacle in satisfactory surgical treatment of full cosmetic result.

CONCLUSION

The radiological analysis of the osseous changes in medial nasal clefts demonstrates their striking mutual similarity and increases the probability of their origin. The changes of some of the structures are regular enough as to be considered important in mutual combination. We therefore believe the x-ray examination to be not only an essential clue in surgical treatment of medial cleft defects, but also to contribute to the accuracy of their classification and to the solution of questions on formal genesis.

Acknowledgement. The photo-copies of the skiagrams were made on the electronic copying device at the VÚZORT laboratory in Prague-Vokovice. We should like to thank ing. Z. Faimann and his co-workers for their kind readinees in making the photo-copies.

SUMMARY

The authors carried out detailed x-ray evaluation of changes in the skeleton of skull and face in 8 patients with frontal cephalocele, 4 patients with fronto-nasal cerebral hernia and in 14 patients with proper so called medial nasal cleft. In the first two groups, defects in the frontal bone are more frequent

and splanchnocranial defects as smaller. In the third group a picture of hypertelorism with flattening of glabella and widening of the ethmoid labyrinth, thickening or even doubling of the nasal septum especially in the ventral part with widening of the nasal cavity, predominates. Often, the frontal sinuses are either atypically formed or missing. The nasal bones are usually malformed, thickened, protracted and attached to the frontal bone at an unusual angle. Spina nasalis anterior is spur-like, protracted in forward and upward direction. In case of simultaneous medial cleft of proc. alveolaris, the maxillae are asymmetrically developed and the palate vault is deformed.

RÉSUMÉ

Les malformations osseuses se trouvant chez les fentes du nez médiales

M. Brejcha, M. Fára

Les auteurs ont entrepris une classification aux rayons X détaillée des malformations osseuses de crâne et de la face chez huit des malades souffrant de céphalocele frontale, chez quatre des malades souffrant de l'hernie du cerveau frontonasale et chez quatorze des malades souffrant de la propre fente du nez médiale. Les deux premières grouppes montrent souvent des défauts de l'os frontal tandis que les malformations dans la partie splanchnocraniale sont moins fréquentes. Dans la troisième partie il y a souvent l'image typique de l'hypertelorisme avec la glabelle platte, le labyrinte de flaire remarqué, le septum nasi osseux dans la partie ventrale plus épaisse ou bien encore dédoublée, la cavité nasale élargie. Les cavités frontales sont atypiques ou il y a leur manque total. Les os nasals sont malformés, épais, prolongés, ils sont liés à l'os frontal sous l'angle atypique. Spina nasalis antérior est prolongé sous forme d'éperon visant en avant et en haut. Au cas de la fente médiale du procésus alvéolare la machoir supérieure est asymétrique et la voûte du palais est déformée.

ZUSAMMENFASSUNG

Knochenveränderungen bei mittleren Nasenspalten

M. Brejcha, M. Fára

Die Autoren unternehmen eine eingehende röntgenologische Auswertung der Veränderungen am Schädel- und Gesichtsskelett bei 8 Kranken mit frontaler Zephalozele, 4 Kranken mit frontonasalem Hirnvorfall und bei 14 Kranken mit eigentlicher, sogenannter mittlerer Nasenspalte. Bei den ersten zwei Gruppen bestehen häufige Defekte im Stirnbein, die Deformationen im Splanchnocranium sind geringfügiger. Bei der dritten Gruppe überwiegt das Bild des Hypertelorismus mit Verflachung der Glabella, Erweiterung der Geruchlabyrinthe, Verdickung oder auch Verdoppelung der knöchernen Nasenscheidewand besonders im ventralen Teil und Erweiterung der Nasenhöhle. Die Stirnhöhlen sind oft atypisch gebildet oder fehlen. Die Nasenknochen sind malformiert, verdickt, verlängert und sitzen am Stirnbein im ungewöhnlichen Winkel. Die spina nasalis anterior ist bis spornartig nach vorne und nach oben verlängert. Bei gleichzeitiger Medialspalte des processus alveolaris sind die Maxillen unsymmetrisch entwickelt und das Gaumengewölbe ist deformiert.

RESUMEN

Cambios huesosos en las grietas medianas de la nariz

M. Brejcha, M. Fára

Los autores hicieron la apreciación radiológica detallada de los cambios del esqueleto del cráneo y de la cara en ocho enfermos con hernia cerebri de frente, en cuatro enfermos con encephalocele frontonasal y en catorce enfermos con la grieta de la nariz propia la llamada mediana. Los primeros dos grupos tienen defectos frecuentes en el hueso frontal, las deformaciones del esplanchnocraneo son menores. En el tercer grupo predomina el cuadro del hipertelorismo con la glabela aplastada, con la emplificación de los laberintos olfatorios con el engrosamiento o también con la duplicación del tabique óseo de la nariz especialmente en la parte ventral y con la amplificación de la fosa nasal. Los senos frontales muchas veces son formados atípicamente o faltan. Los huesecillos nasales suelen ser deformados, engrosados, alargados, encajan al hueso frontal en el declive extraordinario. Spina nasalis anterior suele ser también extendida como la espuela hacia adelante y hacia arriba. En la grieta mediana simultánea de proc. alveolaris suelen ser desarrollados disimétricamente los maxilares y deformada la bóveda del paladar.

Dr. M. Brejcha, Šrobárova 50, Praha 10, Czechoslovakia

The International Association for Maxillo-Facial-Surgery will hold its 1st World-Congress in Dresden from the 8th—12th May 1972. The association purposes to unite all collegues who are working in the field of jaw and face-surgery (for example jaw-surgeons, plastic-surgeons, nose-ear-throat-surgeons, neuro-surgeons and so on).

Members of the presidium are: President: Prim. Dr. H. G. Bruck, Wienna; secretary-general: OMR Prof. Dr. Dr. W. Bethmann, Thallwitz; vice-presidents: Prof. Dr. L. Bornstein, Iowa-City; Prof. Dr. H. Brückner, Rostock; Prof. Dr. H. Z. Konuralp, Istanbul; Prof. Dr. L. Lebourg, Paris; Prof. Dr. V. Popescu, Bukarest; Prof. Dr. Fr. Urban, Praha; treasurer: MR Dr. Dr. H.-J. Hochstein, Thallwitz.

Main subjects of the 1st world-congress are:

1) newer methods in the treatment of facetumors,
2) unspecific inflammations, proceeding from the skull,
3) orthopaedic operations on the skull of the face.

Notification for participation as well as for lectures, reports and films are requested to be sent to: OMR Prof. Dr. Dr. W. Bethmann, 7251 Thallwitz/DDR, Schlossklinik. Notifications for membership of the association may be directed to Prof. Bethmann, Thallwitz too.

Central Military Hospital, Prague (Czechoslovakia)
Department of Maxillofacial Surgery
Head Ass. Prof. Josef Kufner, M. D., CSc.

THE SURGICAL REMOVAL OF LARGE FACIAL HAEMANGIOMA

J. KUFNER, Š. PETROVIČ

The submitted paper reports the technique of the surgical removal of large cavernous facial haemangioma as carried out at present at the Department of Maxillofacial Surgery, Central Military Hospital in Prague. We do not intend to describe in detail all therapeutic methods for removal of these tumours, we shall only discuss the surgical treatment. In this sector also, much progress has been made and new therapeutic methods are being applied.

Haemangioma is a tumour composed of hypertrophic blood vessels. Vessels maintain a more or less regular condition even in progressively growing angioma.

According to the character of the hypertrophic vessels several variants are being distinguished (Šikl).

Capillary haemangioma manifests as a vessel convolution structurally corresponding to capillaries.

The cavernous haemangioma consists of irregular cavities of different size filled with blood and lined by the endothelium. Between the cavities is a thin tissue septum.

The arterial and venose haemangioma consists of vessels resembling imperfect arterioles. To these belongs the angioma arteriale racenosum composed of a convolution of larger arteries reminding of a bundle of worms.

The malignant metastasing haemangioma has the character of a cavernoma which grows in the periphery in form of immature capillaries (Šikl, Bednář et al.). All the mentioned haemangioma variants occur in the face.

For therapeutic purposes it is important to know the dynamics of development of the individual haemangioma types and this requires clarification of the question of spontaneous involution. The greatest tendency to spontaneous involution have skin forms by 95% still during pre-school age.

The cavernous haemangioma also frequently involutes, not however at such percentage, as skin types. Involution occurs somewhat later and is usually slower (Pešková).

E. Běhounková

HISTOLOGIC EXAMINATION OF SKIN GRAFTS STORED AT +4 °C

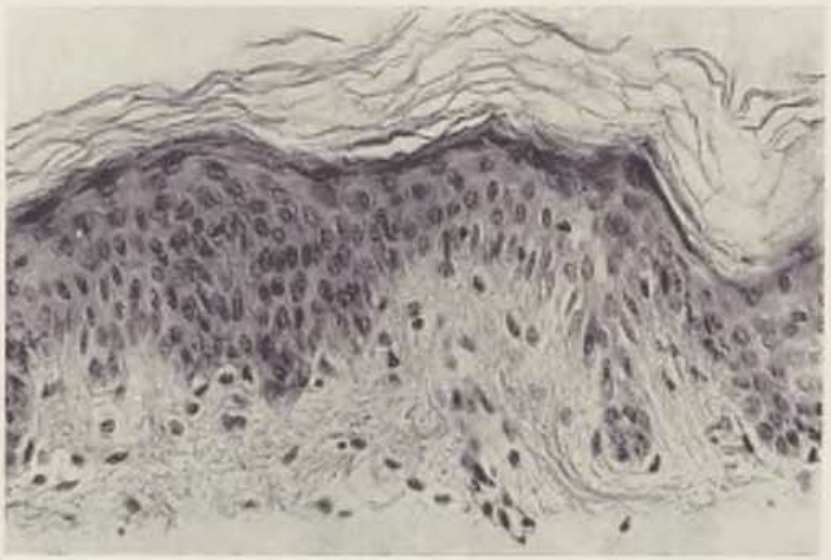


Fig. 1. Histologic section of graft immediately after removal. Stained by hematoxylin-eosin-saffron, ×160

Fig. 2. Histologic section of graft stored for 7 days. Degenerative changes in the epidermis. Stained by hematoxylin-eosin-saffron, ×180

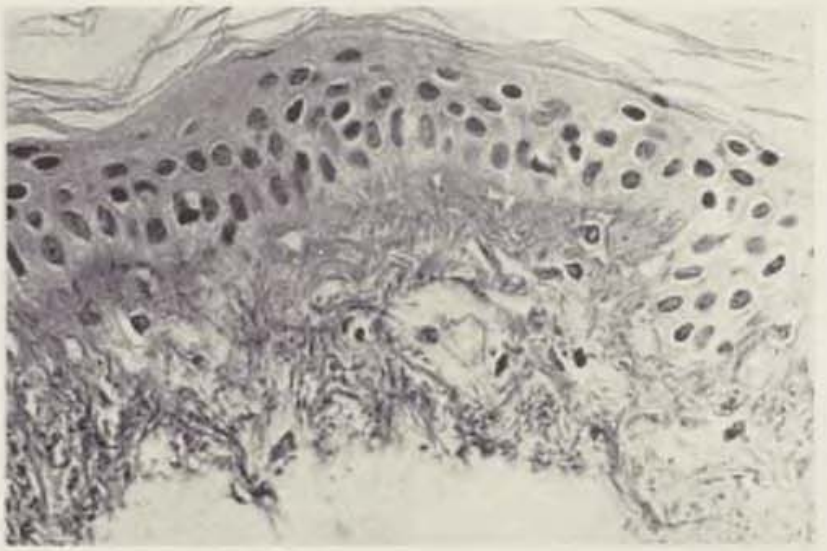


Fig. 3. Histologic section of grafts stored for 13 days. Denser drawing of fibrils in papillary layer of dermis. Van Gieson stain, ×250

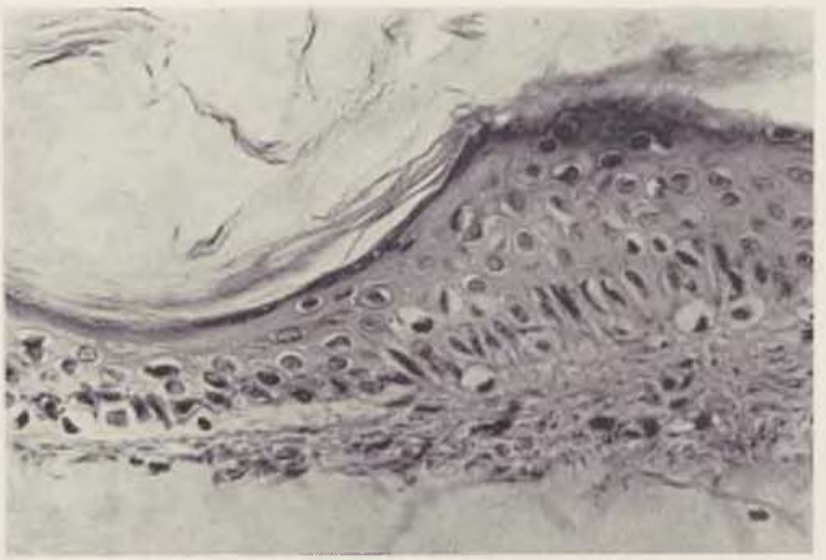


Fig. 4. Histologic section of graft stored for 16 days. Starting separation of epidermis. Stained by hematoxylin-eosin-saffron, ×250

Fig. 2. Ligated left external carotide artery above the branching of the left facial artery. — Fig. 3. Left maxillary artery recanalized by means of a link from the left vertebral artery

Fig. 4. Extent of haemangioma of the left cheek in the final phase of left sided vertebral arteriography. — Fig. 7. Leftsided carotide arteriography demonstrates the haemangioma of the upper lip, right cheek and efferent artery

In rare cases the cavernous haemangioma may be of malignant character in its clinical development, due to considerable prolipheration which can not be mastered by therapy.

So far two main directions predominate in the therapy of haemangioma: surgical and actinotherapeutic.

Actinotherapy applied with us mainly in the forties and fifties, is frequently followed — along with favourable involution of superficial haemangioma — by changes of skin or subcutum, in young individuals however we even ascertained disturbances in the facial skeleton. For this reason actinotherapy is now only sometimes applied by us in rapidly growing haemangioma with the aim of limitting the growth and inducing the involutional process, at other times it is a part of the general therapy mainly before or after surgical therapy.

Ra-therapy applied chiefly in haemangioma of the tongue and of the oral base, consists in the introduction of radium needles directly in the tumour area. The results may be favourable either if applied alone or as part of complex treatment.

At present, the surgical part of haemangioma therapy in adults is as follows:

Sclerotization by injecting sclerotizing solution into the tumour (Varikocid, hypertonic glucose, 70% alcohol /according to Aganov/ etc.). This is in principle a lengthy therapy requiring several rather painful injections. In some localisations of the tumour (region of orbita) it is dangerous and ineffective in large cavernoma, because the sclerotizing solution disappears rapidly. Serious complications may arise due to the possibility of secondary bleeding directly in the place of injection.

In haemangioma, electrocoagulation of the tumour is formed by introducing the needle deep into the tumorous tissue. Again the therapy is lengthy with all the disadvantages reported in sclerotization.

Mattres suture of the tumor is also an incomplete operation irrespective whether carried out in form of transcutaneous or oral transmucous stitches. The volume of the tumour is only partly diminished but in the place of sutures there may form skin necrosis with secondary bleeding and the infection might penetrate thus directly into the tumour region. Partial excision repeated at certain time intervals (6 months to one years) might be successful in some types of haemangioma. It is a protracted therapy, technically difficult in large haemangioma, with the danger of postoperational and secondary bleeding. With partial excision we may observe involution of the rest of the tumour but sometimes we even meet with its accelerated growth which is rather difficult to treat.

Ligation of efferent or regional vessels without removal of the tumour itself is usually ineffective. The remaining smaller efferent vessels become rapidly hypertrophic and the blood is often collateralized from other beds and after some time blood flows again into the tumour as before the ligation.

Fig. 1. Extensive haemangioma of the left cheek

This complicates also the anatomic conditions for later surgical removal of the tumour. For this reason we object to the preventive ligation of vessels without simultaneous surgical removal of the tumour.

Finally a new surgical method with which we have no experience and of which we know only from literature — cryosurgery — ought to be mentioned. A deepfrozen metal sond — 195 ^{0}C is applied, the haemangioma is frozen and in parts or completely removed. Possibly necrotis is induced by freezing and then the necrotic tissue removed. Thus it is a method especially suitable for the removal of cavernous haemangioma.

We have come to the conclusion that all the mentioned therapeutic methods are not of much use for the removal of large cavernous haemangioma in the facial region. Preparatory irradiation is of little effect in large haemangioma, sclerotization may only serve as preparation in superficial haemangioma. Ligation of common or external carotide artery may threaten the cerebral blood supply (Hermann) and just as in mattress suture or circumsuture of the tumour, the blood circulation collateralizes rapidly and becomes rather a burden to the subsequent surgical removal of tumours.

It is therefore at present the aim of our surgical therapy to extirpate the complete haemangioma in a one-step operation. This difficult task requires perfect and extensive preparation.

It is essential on the whole, to carry out special internal examinations (vascular malformations, congenital anomalies in the heart) as well as general examination (lung, heart), haematologic examination with the securing of blood suitable for the transfusion. If general anaesthesia with artificial hypotension, possibly even with hypothermia is intended, the kidney function must be examined (clearance).

In respect of the operation itself, it is first of all necessary to make x-ray or tomographic pictures. The purpose is the determination of — mainly — facial skeleton changes. Decisive is however the arteriographic examination which at contrast filling of carotide and vertebral arteries demonstrates the efferent vessels as well as the dimensions of the haemangioma and its relation to the skeleton and the surrounding organs. It is of special importance to clarify the collaterals, the peculiarities of blood supply and vein return. This assessment is the basic point for the removal of the tumour.

It is advisable before the operation, to consult the anaesthesiologist, the roentgenologist, the physician carrying out the blood transfusion and possibly further specialists. The purpose is, to decide the method and type of general anaesthesia. On principal we decide upon endotracheal general anaesthesia with nasal or oral intertion according to the localisation of the tumour. In order to stop the blood flow into the respiratory pathways or lung, we prefer

Fig. 5. The patient five years after removal of haemangioma without relaps. — Fig. 6. Significant tumorous swelling of the upper lip and left cheek

pharyngeal tamponade to inflated cuff of the endotracheal tube. We operate usually under controlled decreased blood pressure (controlled hypotension). Decreased blood pressure diminishes the blood losses during operation, improves visibility of the field of operation. After extirpation of the haemangioma the anaesthesiologist increases the blood pressure to normal values. This discloses the sources of bleeding in the operational defect so that we have the possibility to stop the bleeding precisely before closing the defect.

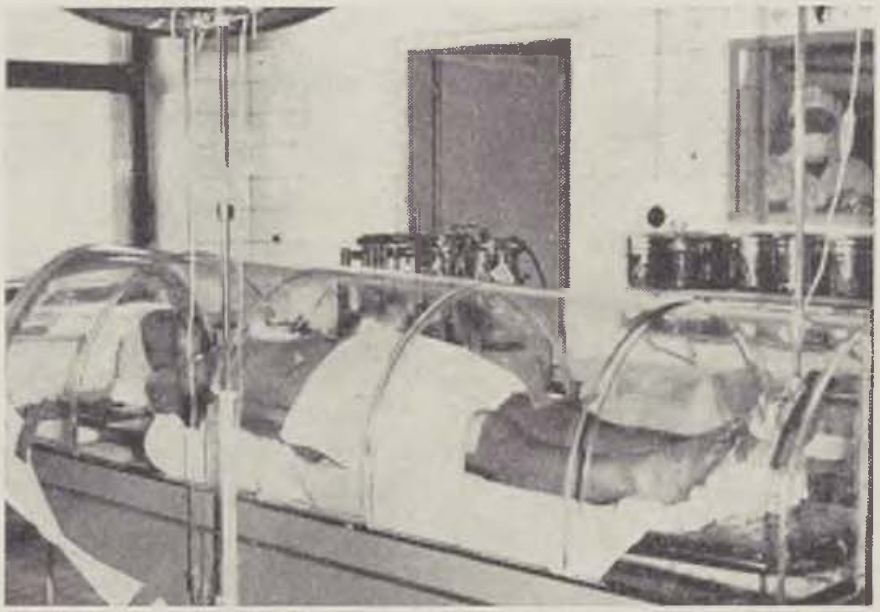


Fig. 8. Total view of the hypotherm

If the operation requires temporary or definite closing of the large arteries (unilaterally the common carotide artery or vertebral artery, or bilaterally the external carotide artery) we decide upon controlled hypothermia. The body of the patient is cooled to 26^0—$30\,^0$C and thus the brain is much less threatened by hypoxia.

With the roentgenologist we plan the procedure of temporary or complete closing of the regional or efferent anatomic collateral vessels. We arrange with the doctor carrying out the blood transfusion, when and what amounts of blood suitable for the transfusion should be supplied. Possibly the technique of transfusion is discussed.

Only when these preparations were carried out and provided the total condition of the patient is satisfactory, the operation is started. First the main efferent vessels are ligated and then the tumour is extirpated. The tumour is excised by electroscalpel in soft tissues. The reason is not that we may fear the tumour would grow but because we wish to diminish bleeding from the walls of excision. Bone preparation, especially in the maxilla is mainly carried out by chisel. This is quicker than preparation by drilling. We endeavour to

carry out extirpation as quickly as possible and "in toto" even if at that moment the blood losses should be greater. Bleeding in soft tissue is stopped by ligation and less frequently by coagulation. Bleeding from bone surfaces is stopped by tampones soaked in hot saline solution, crushed bone, wax or absorbable tampone. If necessary the tamponade is pressed to the wound and fixed by stitches or splints of rapidly polymerising resin, to the teeth in the vicinity of the defect. Skeletal defect on the mandible or maxilla can be immediately primarily substituted by bone graft. Best suitable is autograft if

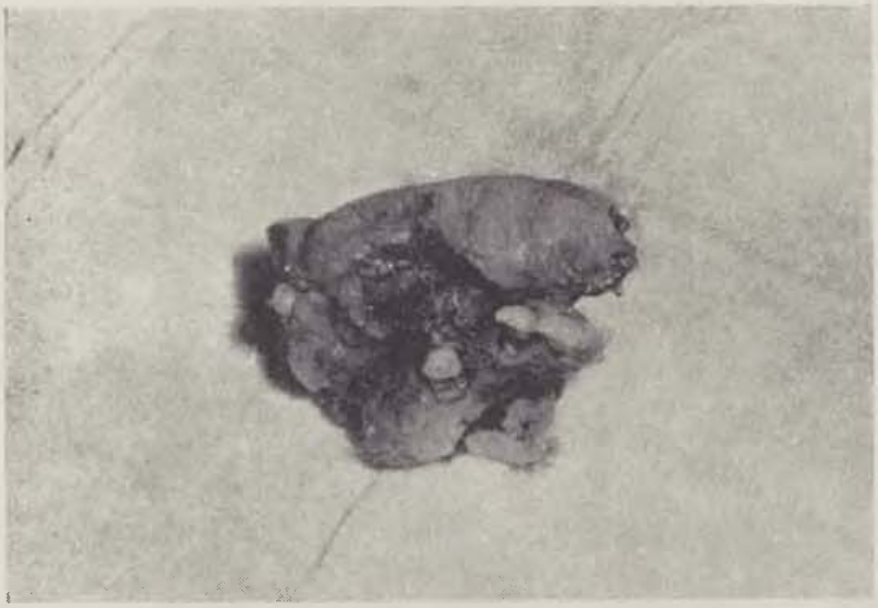


Fig. 9. Resection preparate

there is sufficient soft tissue for its cover. If not sufficient soft tissue is at disposal, we resort to suturing the skin of the oral mucosa in the region of defect.

This paves the best way to secondary plastic surgery of the defect and it is most certainly better than forced closure of the defect. Because the electroscalpel left marks, we excised the rim of the skin by normal scalpel, before suturing the soft tissues.

Bleeding must be stopped, the general condition of the patient must be stabilized and then operation is complete. It is a matter of course that carefully measured blood lost during the operation is supplied and antibiotics administered.

The patient should wake up gradually and calmly after general anaesthesia. After the operation we apply iced compresses locally and follow up the total condition, deciding upon suitable therapy. We take care that the patient breathes freely and that the supply of liquids is satisfactory. The operated patient must be continuously controlled. Secondary bleeding is most frequent on the first day of operation and about one week after the operation and has to be stopped immediately.

The reported method of surgical extirpation of large facial haemangioma, entails a lot of work, but under the present possibilities of medicine it proves most satisfactory with us.

At the Department of Maxillofacial Surgery, Central Military Hospital in Prague, large haemangioma was removed by direct one-step operation in 18 patients during the last six years. We should like to report the treatment of at least two remarkable patients.

Fig. 10. The patient two years after the operation with obturation prosthesis and covering bandage

Patient S. Z., 32 years, case history No. 385/63 was admitted to our Department with diagnosis of an extensive haemangioma of the left cheek. After extraction of his left wisdom tooth in 1959 a plumsized swelling of elastic consistency formed on the left cheek. Histologic examination disclosed a cavernous haemangioma. In 1961 the left external carotide artery was ligated, later the tumour was sclerotized. None of these operations stooped the tumour from growing further (both operations had been carried out at another Institute).

When the patient had been admitted to our Department, we ascertained a tumour of the left cheek in size of a goose egg of elastic consistency. The tumour became filled up when the patient leaned forward (Fig. 1).

Left-side carotide arteriography disclosed that the external carotide artery is ligated above the branching of the facial artery (Fig. 2) and the left-side

vertebral arteriography (Fig. 3) disclosed that the final branches of the external carotide artery are filled up by a 4 mm connecting link from the stem of the left vertebral artery receding at height of the atlas and that the haemangioma of the left cheek 6×9×5 cm is being filled up by branches of the maxillary artery (fig. 4).

The tumour was removed by one-step operation under general endotracheal anaesthesia with controlled hypotension. The patient was operated on 6 years ago without relapses and he is not requesting any cosmetic operation (Fig. 5).

Furthermore we should like to report the case of female patient B. L., 20 years, case history No. 218/67. In 1960 the patient observed that the right half of the lower lip swells after physical or psychic strain. Examination disclosed a haemangioma.. In 1961 the tumour was unsuccessfully sclerotized. Further growth was not even prevented by a further operation: ligation of the facial artery and ligation of the external carotide artery later ligation of the common carotide artery on the right side, each time with simultaneous excision of the tumour. Several times the patient bled dangerously and each time the bleeding only ceased after considerable blood losses and decreased blood pressure. Bleeding threatening the life of the patient occured in 1967 at the Clinic of Plastic Surgery in Prague after the extraction of the right upper praemolar tooth. The bleeding was stopped by means of pressure tamponade fixed by an acrylic splint on the teeth of the maxilla.

When the patient had been admitted to our Department we ascertained a great swelling of the upper lip, adjacent parts of the right cheek (Fig. 6), the basal part of the nose was deviated to the left and the skin over the tumour was of blue-violet colour. On the alveolar processes of the maxilla was the acrylic splint. At first we intended to carry out arteriographic examination in the patient. When brought under general anaesthesia in order to carry out this examination, the tamponade covering the wound of extraction was damaged, considerable bleeding started, the patient aspired blood, he was suffocating and we were obliged to carry out tracheotomy. Two days after the arteriographic examination we found the right common carotide artery to be ligated and the haemangioma in the region of the lower lip, right cheek and the alveolar process of the right maxilla possessed rich vascular supply from the maxillary artery which became recanallized after prior ligation and was filled with connections from the stem of the right vertebral artery. Further supply occured through facial anastomosis from the maxillary artery on the left and less anastomosis from the ophtalmic artery (Fig. 7).

After hypothermic decrease of the body temperature to 27 ^{0}C (Fig. 8), we operated the patient under controlled hypotensive general anaesthesia. After ligation of the communication from the right vertebral artery into the maxillary artery and after temporary ligation of the external carotide artery on the left, we resected two thirds of the upper lip, part of the right cheek, the right third of the lower lip, we furthermore partly resected the right maxilla and the alveolar processes of the intermaxilla (Fig. 9).

After increasing the blood pressure and after carefully stopping the bleeding, we closed the upper rim of the defect by local shifting of skin, we sutured the skin with the mucosa on the lateral rims of the defect and covered the defect itself by tamponade. The postoperational course was without complications. Bleeding of the patient during the attempted arteriography and during the operation itself, caused us to carry out 14 blood transfusions altogether. In all, the patient had been given 30 blood transfusions since the first bleeding. The patient with obturation prosthesis has been without relapses for two years after the operation (Fig. 10a, b) and is now being further treated at the Clinic of Plastic Surgery in Prague.

Acknowledgement: The authors consider it their pleasant duty to extend their thanks to their co-workers, the roentgenologist Bret CSc., and to the anaesthesiologist Ass. Prof. Pokorný, CSc. and Počta CSc.

SUMMARY

The authors reported their experiences with the surgical removal of large facial haemangioma by one-step operation. They stress the necessity of thorough general and local preparation for this rather difficult task. They report their experience with two operated on patients.

RÉSUMÉ

L'intervention chirurgicale chez les hémangiomes étendus de la face

J. Kufner, Š. Petrovič

Les auteurs présentent dans ce travail ses expériences avec l'intervention chirurgicale en un temps des hémangiomes de la face étendus. Ils soulignent la nécessité des préparatifs locaux et de l'état total du malade pour cette intervention de grave charactère. Ses expériences sont illustrées par présentation de deux des malades opérés.

ZUSAMMENFASSUNG

Chirurgische Entfernung umfangreicher Gesichtshämangiome

J. Kufner, Š. Petrovič

In der Arbeit beschreiben die Autoren ihre Erfahrungen mit der einmaligen chirurgischen Entfernung umfangreicher Hämangiome im Gesicht. Sie heben hervor die Notwendigkeit einer eingehenden allgemeinen und örtlichen Vorbereitung für diese anspruchsvolle Leistung. Ihre Erfahrungen illustrieren sie an zwei operierten Kranken.

RESUMEN

Eliminación quirúrgica de los hemangiomas grandes de la cara

J. Kufner, Š. Petrovič

Los autores describieron en la obra sus experiencias con la eliminación quirúrgica aislada de las hemangiomas grandes de la cara. Acetúan la necesidad de la preparación detallada total y local para esta intervención exigente. Sus experiencias esclarecen con ejemplos en dos enfermos operados.

REFERENCES

1. **Burian F.**: The Plastic Surgery Atlas. Butterworths London, Praha SZdN 1967.
2. **Halmoš J.**: Čs. Stomat., 53, 1 : 32, 1953.
3. **Komínek J., Toman J., Rozkovcová E.**: Dětská stomatologie. Praha SZdN 1966.
4. **Kostečka F.**: Čs. Stomat., 40, 1 : 1, 1940.
5. **Krolluper J.**: Prakt. zubní lék., 12 : 244, 1964.
6. **Škach M., Švejda J., Liška K.**: Onemocnění ústní sliznice. Praha SZdN, 1963.
7. **Pešková H.**: Plastická chirurgie kosmetických vad. Praha SZdN, 1968.
8. **Toman J., Hanek P., Pehrová A.**: Čs. Stomat., 65, 3 : 203, 1965.
9. **Toman J., Sovadina M.**: Stomatochirurgie. Praha SZdN 1967.
10. **Živný J.**: Čs. Stomat., 45 : 198, 1955.

Ass. Prof. Dr. J. Kufner CSc., Central Military Hospital, Praha-Střešovice, Czechoslovakia

---

LIGUE INTERNATIONALE POUR LA SAUVEGARDE DE LA MAIN

Le 8^{0} Cours International de Chirurgie de la Main dirigé par le Docteur Marc ISELIN aura lieu à TUNIS, du 26 au 31 Octobre 1971, au Centre Orthopédique de KASSAR-SAID.

PROGRAMME:

1. Matinées à l'Hôpital de 9h.30 à 13h.: Travaux pratiques par petits groupes sur le cadavre, présentation de malades et opérations télévisées.

2. De 13h. à 17h.: Après-midi après repas pris en commun.

3. De 17h. à 19h.: 10 leçons théoriques en français avec traduction simultanée en anglais et en allemand.

Renseignements et inscriptions: M^{elle} M. ADJOURI, Secretariat de Chirurgie, Hôpital de Nanterre 403, Avenue de la République, 92 NANTERRE (France).

Le nombre des participants, étant donné la formation de groupes de travail, est limité à 50, dans l'ordre des inscriptions.

Frais d'inscription au Cours: 900 francs français. Conditions spéciales pour les chefs de clinique et internes en exercice.

Conditions spéciales de voyage PARIS-PARIS sous forme d'inclusive tour sur demande avec séjour en hôtel de luxe (plage et piscine).

Charles University Medical Faculty of Hygiene, Prague (Czechoslovakia)
Clinic of Plastic Surgery
Head prof. H. Pešková, M.D., DrSc.

THE IMPORTANCE OF FOLDING DOWN MUSCLE STUMPS IN THE OPERATION OF UNILATERAL CLEFTS OF THE LIP

M. FÁRA

Careful reconstruction of the musculature is the pre-condition for the rehabilitation of each operated part of the body, in respect of shape and function. This condition of physiologic operation applies also fully in cleft of the lip. Only correct and early reconstruction of the musculus orbicularis oris (m.o.o.), affords his full introduction into function and by his pulling and pressing effect upon the surroundings it may influence the development of the entire central facial region favourably. A free lip with naturally function-

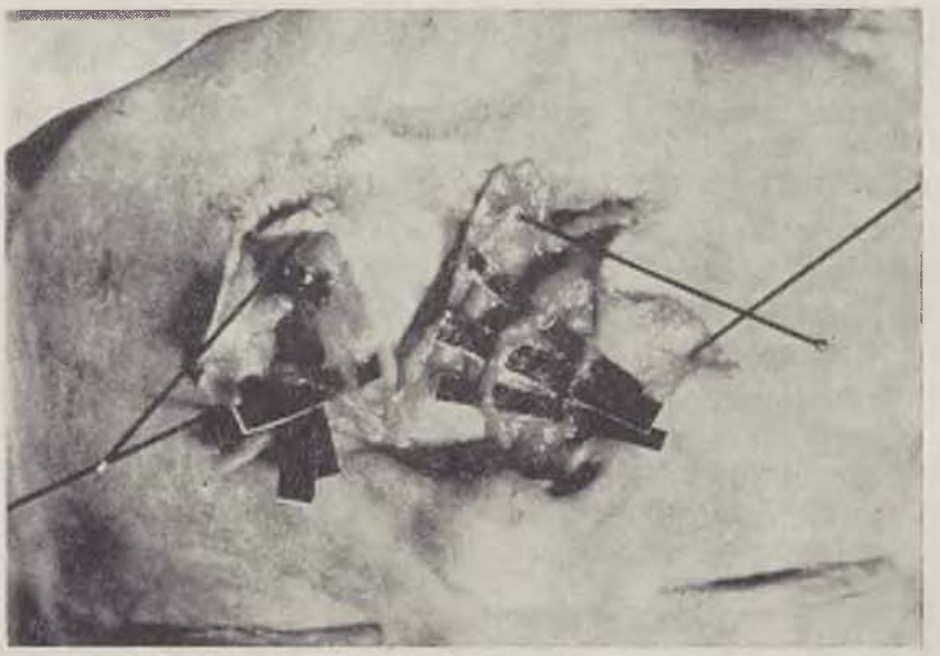


Fig. 1. Autopsy of m.o.o. in incomplete left-sided cleft with narrow bridge. Some dissected main muscle bundles placed on stripes of black paper for better visibility. On the lateral side of the cleft the passing of the muscle bundles into the bridge is clearly visible in the threshold of the nostril. On the medial (filtral) side however, the stronger muscle bundles only reach the central line of the lip.

ing muscle is namely of invaluable modelling effect upon maxillary parts dislocated by the cleft and deformed at its frontal ends (1, 2, 3, 4).

Yet the importance of the lip muscle in a cleft is often still being underestimated. Some surgeons still consider the final condition of the oral sphincter as of little importance in comparison with skin reconstruction and for this reason the development of surgery of clefts of the lip is almost solely directed to the introduction of new methods of skin incisions and sutures.

The m.o.o. in cleft, is likely to undergo many changes which so far were not investigated sufficiently and thus are not even well known. Yet if these changes are being respected in the operation, the esthetic and functional result of treatment is considerably improved. The incomplete knowledge of the anatomy of facial clefts is namely caused by lack of not yet operated on, autopsy material.

In order to ascertain the peculiarities of the m.o.o. in cleft of the lip and to utilize the obtained information for clinical purposes, we carried out in the past twelve years in cooperation with several pathologic-anatomic Institutes, autopsy in 25 still-born children with different type of cleft.

M. o. o. in unilateral cleft

Muscle bundles which aim in horizontal direction from the oral corners to the middle line, turn upward along the cleft margins. In complete clefts they terminate at the lateral side below the attachment of the nasal wing

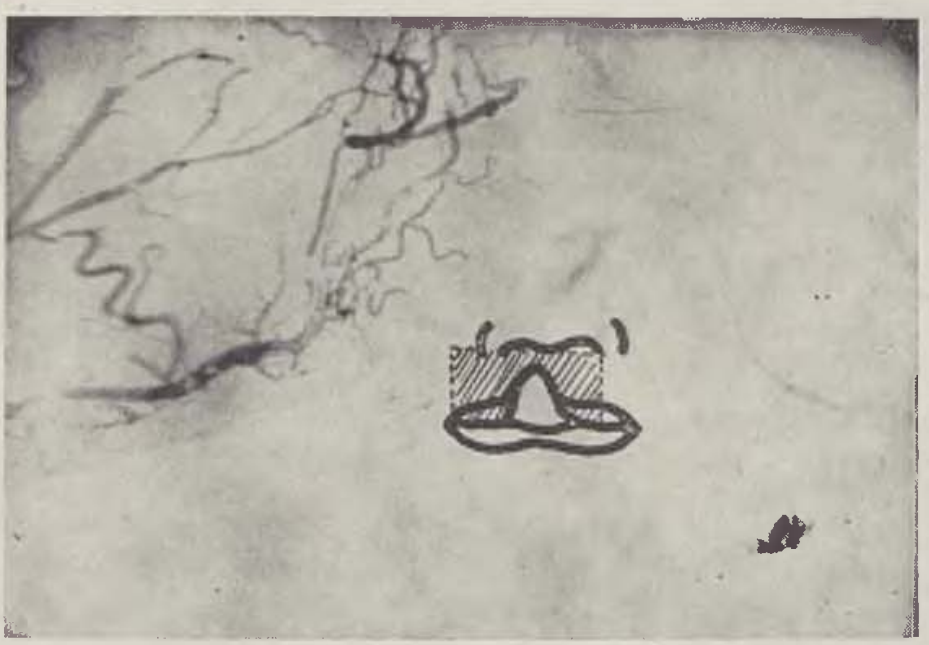


Fig. 2. Arteriogram of the upper lip of a still-born child with incomplete right-sided cleft. Stained by baryum-formalin. There is a striking difference in thickness and density of the arteries of the lateral and medial edge of the cleft. The arteries of both sides follow the edge of the cleft. The arteries of both sides follow the edge of the cleft. From the lateral side a stronger arterial branch penetrates into the bridge in the threshold of the nostril.

and at the filtral side below the attachment of columella where they are in their greater part attached to the maxillary periosteum and in their smaller part disappear in the subcutum. Even in more serious cases of incomplete clefts, where only narrow bridges developed, the muscle bundles behave similarly.

In less serious incomplete forms (in which the cleft does not exceed 2/3 of the height of the lip) the muscle fibers pass over the peak of the cleft and penetrate from the lateral into the filtral part of the lip. The muscle in the cleft region is infiltrated and disturbed by trabecula of collagen connective tissue.

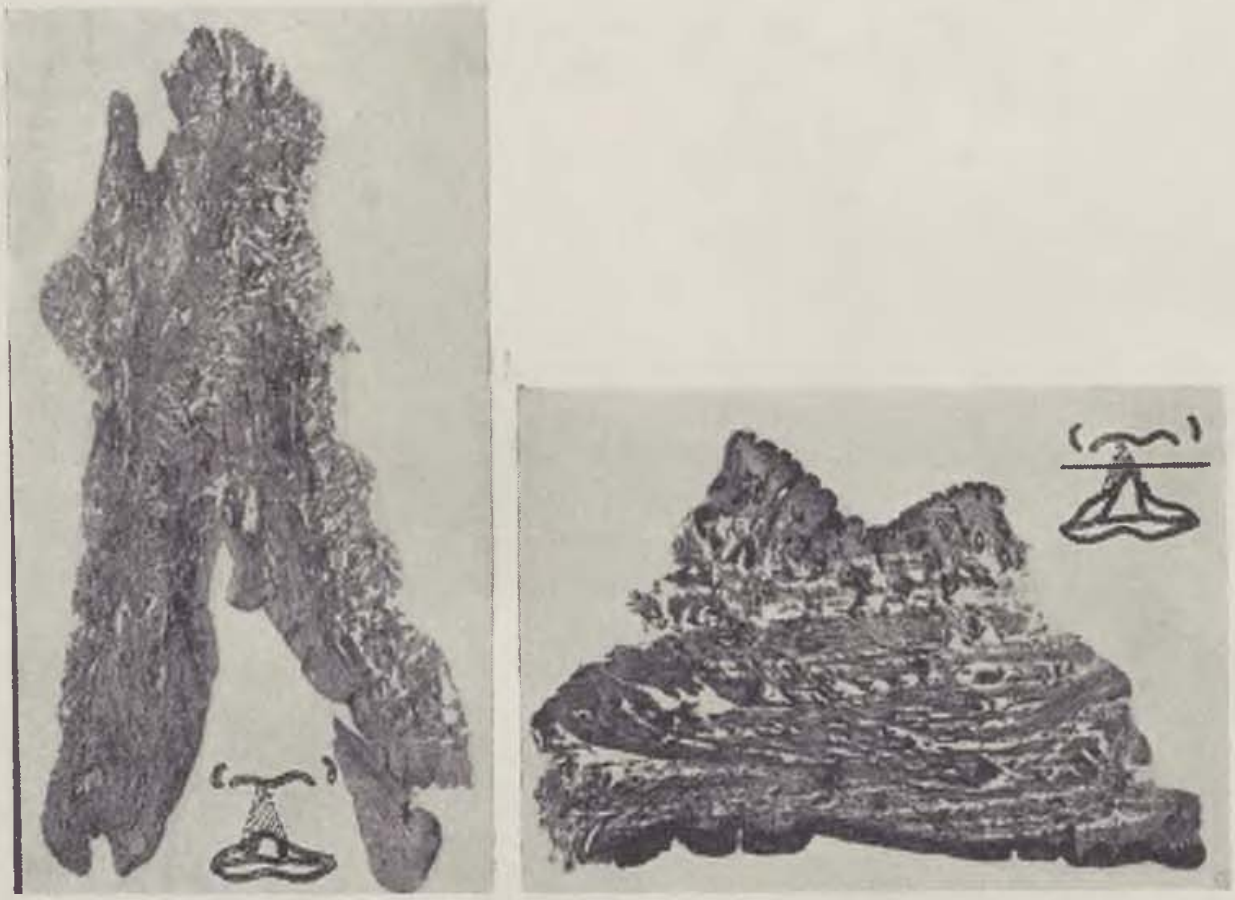


Fig. 3. Operational dissection from a more serious incomplete right-sided cleft. Frontal incision from the central level of the lip. The muscle bundles follow the margin of the cleft. — Fig. 4. Operational dissection from a less serious incomplete right-sided cleft. The horizontal incision was performed low at the peak of the colobome. The muscle bundles change direction here, they deviate above the colobome and pass it from one side to the other.

An excess and swelling of lip muscle components may be seen and palpatively ascertained on the lateral side in complete and in incomplete clefts. This is caused by a certain contraction of the muscle which was unable to develop into length. The musculature may on the other hand be underdeveloped on the filtral side in the border region and sometimes even

in the entire half of the filtrum turned to the cleft. The muscle bundles penetrate only with difficulty over the central line of the lip. The task of growing, which in respect of embryogenesis should be carried out by the opposite muscle, is performed rather imperfectly. Thus the muscle contents in the half of the filtrum adjacent to the cleft is usually thinner. In autopsy and in operation there is a visible thinning of the muscle layer which — furthermore — only rarely reaches the cleft margin.

In the least serious incomplete clefts manifesting in a mere coloboma in the lower part of the lip, a groove on the skin protrudes from the peak of the cleft upward to the threshold of the nostril. This external finding always manifests on the muscle ring of the lip, which is comprimated in frontodorsal direction.

Arteries of the upper lip in unilateral clefts

A. labialis sup. on the lateral side of the cleft mostly follows the course of the m.o.o. bundles and deviates parallel with the edge of the cleft upward to the nasal wing, where it anastomises with the a. angularis. In

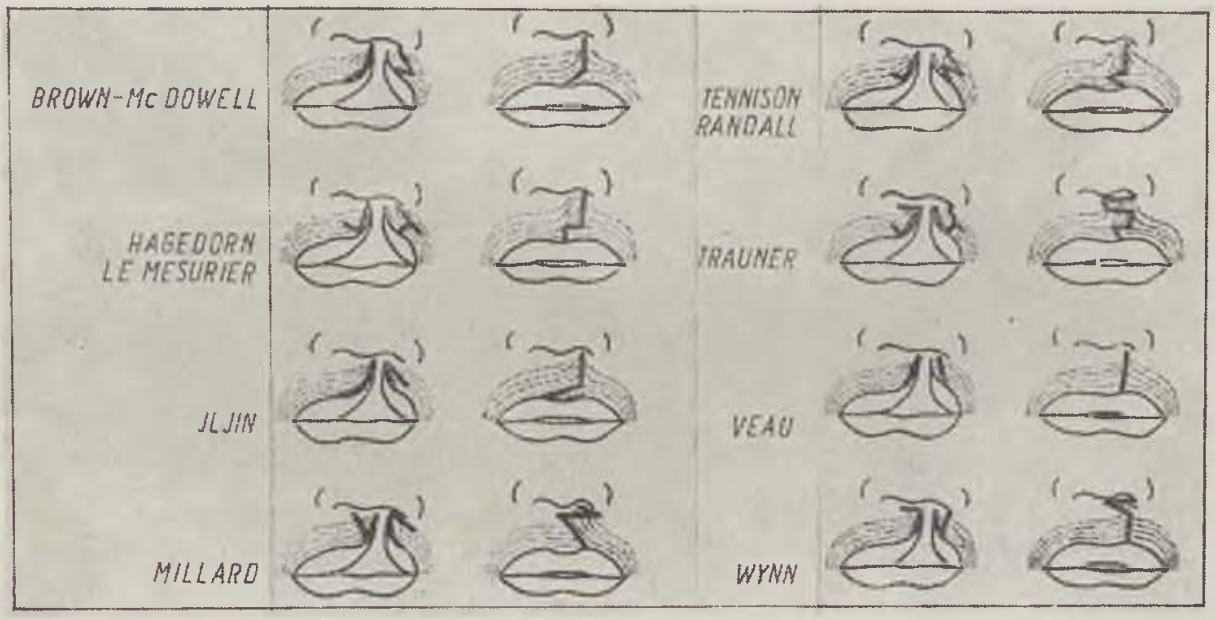


Fig. 5. Scheme of the most important types of operations, used in the suture of unilateral cleft of the lip. The dotted lines on the left demonstrate the original course of the muscle bundles and on the right: changes carried out by incisions during the individual operational methods.

incomplete clefts the artery penetrates via a thin terminal branch into the formed bridge. On the filtral side its course is similar, but the lumen of the main artery and its branches is obviously smaller than on the lateral side and corresponds to a similar difference in the condition of musculature of both labial segments. It mostly passes via terminal branches into the columella where it anastomises with a. nasalis later. possibly with the terminal branch of a. nasalis post. septi.

The ascertained changes in the course of the labial muscle bundles correspond to changes found in muscles of the cleft palate. The differences between the normal and the cleft arrangement of muscles of the lip and of the palate as well, result from the fact that owing to the cleft the muscles extending towards the central line can not attach themselves to the punctum fixum,

Fig. 6. and 7. Muscle stumps foldeddown-linear skin incisions and sutures. Patient A. J. before the operation and 2 years after the operation.

the midline of the lip, possibly in raphe palati and for this reason they insert at some substitute points in the nearest vicinity. In the lip, the maxillary periosteum becomes such a point, in the palate it is the posterior margin of the palate plates (5, 6, 7).

Having learned of these changes in the course and condition of the muscle and arteries in cleft lip, we are obliged to take up new aspects in the operation of clefts.

Any crosswise incision over the course of the muscle bundles, is of unfavourable effect on its peripheral sectors which have thus been separated from the vessel and nerve supply. Yet such incisions which cut to a greater or lesser extent the muscle bundles turning upward to the nasal base, are

components of many operational methods applied in surgery of unilateral clefts. Mainly damaged is the medial filtral muscle stump, but in some procedures even differently large sectors of muscle bundles of the lateral labial segment are cut off from nutrition and inervation.

It must be assumed that thus separated muscle fibers are unable to obtain sufficient nutrition from anastomosis in their upper — predominantly ligamentous — attachment at the nasal base and that they undergo scarring. The nerve supply is destroyed in every case by such a step because it depends upon the facial nerve fibers, proceeding from the corners of the mouth to the center of the lip.

Thus certain muscle parts are damaged directly. But from the point of regenerating possibilities and from the point of physiologic reconstruction of the m.o.o. the resulting condition of the oral sphincter is unfavourably affected when both muscle stumps are attached in some operational procedures "side to side" or "end to side" (Fig. 5). The expected processes of regeneration can not start from the sides of the muscle fibers, nor can the prolipheration from the sections of the muscle fibers of one side achieve the satisfactory growing to the circumference of the longitudinally running fibers of the other side. A scar must form which establishes a partition in the muscle circle. It must be furthermore expected that the power effectiveness of each muscle stump differs very much and thus disturbs the function of the lip permanently.

In order to afford suitable mutual growing together of the muscle fibers of both labial segments, we seek to achieve their "end to end" contact. For this purpose we free the attachment of both labial muscle stumps from the periosteum of the edge of the piriformis apperture and f o l d it in distal direction.

We cut off the ligamentous termination so that the muscle bundles afford sharp intersections and we thus prepare the muscle stumps suitably for suture, which is carried out by very fine catgut. Thus relatively optimal reconstruction of the labial muscle circle is obtained as a condition for favourable rehabilitation of the shape and function of the lip. We may carry out minimal skin excisions because even if the lip is shorter by 1—2mm but starts to function well, it shall be equal in height to the healthy side within 1—2 years.

At the described folding of the muscle stumps in horizontal direction it is sufficient in all the less serious cases, to carry out simple vertical or somewhat arched incisions and sutures on the lip. Only in serious clefts we supplement the hypoplastic medial edge of the cleft with a flap according to Tennison, which is however only formed by skin without including the corresponding muscle.

The advantage of such procedure in which we pay maximal attention to the physiological reconstruction of the m.o.o. manifest not only in the esthetically satisfactory appearance of the lip, but mainly in far more favourable development of the maxilla.

SUMMARY

Success in suture of the lip, is conditional to physiologic reconstruction of the circular oral muscle. This requires:

1) Detachment of both muscle stumps from the piriformis apperture and their folding to natural horizontal direction where they are sutured "end to end".

2) Any auxiliary incisions usual in some operational procedures, must be limited to skin only. All incisions into the muscle are harmful because they may cause heavy scarring of the peripheral sectors of the muscle fibers separated from the vessel and nerve supply.

RÉSUMÉ

L'importance de rotation des moigneaux des muscles chez les becs-de-lievres

M. Fára

La condition du succès de la sutture du lèvre est la réconstruction physiologique de musculus circularis oris. Pour combler cette demande il faut:

1èrement couper les deux attachements des moigneaux des muscles de l'apertura piriformis et les mettre dans leur position naturelle horizontale, puis lier «end to end».

2èmement pratiquer, si nécessaire, toutes les incisions auxiliaires dont on se sert chez certes modifications opératoires uniquement sur la peau. Toutes les incisions touchant le muscle sont nuisables car elles peuvent causer de cicatrisations importantes des parties musculaires périphériques étant éloignées des nerfs et des vaisseaux.

ZUSAMMENFASSUNG

Bedeutung der Senkung der Muskelstümpfe bei Spalten

M. Fára

Die Bedingung für den Erfolg bei der Lippensutur beruht in der physiologischen Wiederherstellung des kreisförmigen Mundmuskels. Zur Erfüllung dieses Fordernisses ist es erforderlich:

1. die Ansätze beider Muskelstümpfe vom Rand der apertura piriformis zu trennen und dieselben in die natürliche horizontale Richtung zu senken, wo sie mit der „end-to-end" Naht genäht werden,

2. jegliche Hilfseinschnitte, die bei einigen Operationsverfahren üblich sind, lediglich auf die Haut zu beschränken. Jegliche Inzisionen in den Muskel sind schädlich, da sie schwierige Vernarbung der peripheren, von der Gefäss- und Nervenversorgung getrennten Abschnitten verursachen können.

RESUMEN

Importancia de la plegadura de los muñones musculares en las grietas

M. Fára

La condición del éxito en la sutura del labio es la reconstrucción fisiológica del músculo bocal. Para la realización de esta exigencia es necesario:

1) Desembragar las inserciones de los dos muñones musculares del borde de la apertura piriformis y bajarlas en la dirección horizontal natural, donde se recosen „end to end".

2) Cualesquiera calas auxiliares, acostumbradas en algunos procedimientos de operaciones restringir solamente a la piel. Todas incisiones en el músculo son dañosas, porque pueden causar la cicatrización grave de las partes periféricas de los filamentos musculares, apartados de la provisión de vasos y de nervios.

REFERENCES

1. **Fára, M., Chlumská, A., Hrivnáková, J.:** Musculus orbicularis oris in incomplete hare-lip. Acta Chir. plast., 7 : 125, 1965.
2. **Fára, M., Šmahel, J.:** Postoperative follow-up of restitution procedures in the orbicularis oris muscle after operation for complete bilateral cleft of the lip. Plast. reconstr. Surg., Baltimore, 40 : 13, 1967.
3. **Fára, M.:** Anatomy and arteriography of cleft lips in stillborn children. Plast. reconstruct. Surg., Baltimore, 42 : 29, 1968.
4. **Fára, M., Hrivnáková, J.:** The problem of protruding premaxilla in bilateral total clefts. Acta Chir. plast., 7 : 281, 1965.
5. **Fára, M., Brousilová, M.:** Experiences with early closure of velum and later closure of hard palate. Plast. reconstr. Surg., Baltimore, 44 : 134, 1969.
6. **Fára, M., Sedláčková, E., Klásková, O., Hrivnáková, J., Chmelová, A., Šupáček, I.:** Primary pharyngofixation in cleft palate repair. Plast. reconstr. Surg., Baltimore, 45 : 449, 1970.
7. **Fára, M., Dvořák, J.:** Abnormal anatomy of the muscles of palatopharyngeal closure in cleft palates. Plast. reconstr Surg., Baltimore, 46 : 488, 1970.

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

---

The First International Congress of **The Chapter of Aesthetic Plastic Surgery**, of the International Confederation for Plastic and Reconstructive Surgery, will be held at the Hotel Nacional in Rio de Janeiro, Brazil, from February 6 — 11, 1972.

This Society cordially invites all plastic surgeons who are members of their established national plastic societies, recognized by the International Confederation of Plastic Surgery, to attend this Congress.

It should be noted that the Carnival in Rio will begin on February 12, 1972, the day after the meeting.

Registration for the meeting should be made with Dr. David Serson; Av. Higienopolis 462, Sao Paulo, Brasil.

J. Ev. Purkyně University, Medical Faculty, Brno (Czechoslovakia),
Clinic of Plastic Surgery
Head Prof. V. Kubáček, M.D., CSc.
Department of Dermatology, Hospital of the District Institute of National Health, Jihlava
Head Chief Physician V. Sedláček, M.D., CSc.

UNUSUALLY EXTENSIVE VULVECTOMY GENITOANAL PAPILLOMATOSIS

J. KRENAR, V. SEDLÁČEK

Reports on the beneficial cooperation of plastic surgeons with gynecologists in reconstructional operations of female genital organs have recently increased continuously. At the Clinic of Plastic Surgery in Brno, this fruitful cooperation has existed already for the past 12 years. The first of the two authors of this report surveyed his experience in this field in a comprehensive monograph (4).

It appeared that it is mainly vulvectomy and congenital aplasia of the vagina in which the gynecologist requires the cooperation of the plastic surgeon. Especially vulvectomy usually involves extensive losses of tissue which have to be replaced either by shifting it from the vicinity [Robinson (5), Čečuk and Prpič (2) a. o.], by shifting a tubular flap [Willams (9)] or by free skin graft [Robinson (5), McGregor (3)]. In the past years we carried out successful reconstructions of the vulva in 8 women. The resulting experience and findings will be published in a separate report. In this paper we intend to report on the reconstruction of the vulva after unusually extensive vulvectomy carried out in the rarely occuring Comel's Dermatosis.

CASE REPORT

At the Clinic of Plastic Surgery a female patient E. P. age 26 years (case history No. 38.795) was admitted with extensive skin changes in the genitoanal region and the adjacent vicinity. The skin changes affected the vulva, reaching proximally into both inguins and affecting almost the entire region of mons pubis. In the lateral direction they reached over the genitofemoral grooves to the adjacent inner surface of both thighs, in dorsal direction they reached behind the anal opening into the breech region. To this entire extent the skin was covered with massive hypertrophic papillomatous formations of almost pseudotumorous appearance; they were forked by deep irregular crosswise running grooves into individual lobes reaching occasionally a heigth up to 3 cm. Their surface was clearly red, moist, shiny, irregularly grained up to bumpy and

covered with dense rather smelling detritus. Examination by bulbous bougie disclosed that the seemingly homogenic surface was composed of densely adjacing finger-shaped, slim processes of equal length, growing from a common base similarly to intestinal villi (Fig. 1, 2).

Before the operation the patient was examined in detail:

Case history disclosed that the patient had been afflicted soon after birth by ichthyotic skin changes on practically the entire body surface. The patient had been under repeated treatment and observation for approx. the past ten

Fig. 1. Extensive papillomatosis in the genitoanal region. — Fig. 2. Enlarged detail from the central part of the right side.

years at the Department of Dermatology at the Hospital in Jihlava. In the past years, erythematously intertriginous changes formed symetrically in the groins and the genitofemoral grooves and were fully resistant to local therapy. Gradually these foci which were originally smooth and flat became hypertrophic and got an uneven surface. Two years ago the patient became pregnant. While the linear ichthyotic changes on the body skin practically disappeared during pregnancy, the papillomas increased to two- to three times their original size. This condition persisted for one year after confinement and resisted any kind of conservative therapy. At the same time subjective complaints (burning up to painfulness, madidans, enormous smell) molested the patient to an extent that after a mutual consultation of the dermatologist, the gynecologist and the plastic surgeon it was decided to remove by surgery the changed skin in the region of the external genitalia and to cover the defects by free dermoepidermal grafts.

The affected area was prepared by means of baths and compresses and an unusually extensive vulvectomy was carried out under general anaesthesia. The internal incision was carried out on the external rims of the small labia on the border of the labia majora. The surroundings of the clitoris were left untouched. The anal opening was circumsized in dorsal direction. The external incision was made at a distance of more than 1 cm from the edge of the changed tissue, i.e. above the mons pubis, in wedge form into both inguins and from there over the internal surfaces of both thighs about 5 cm externally from the genito-femoral grooves in direction of the gluteal regions dorsally to the tip of the breech. The changed tissue of skin including the subcutum was removed in its entire extent (Fig. 3, 4). From the dorsal surfaces of both thighs two large dermoepidermal grafts were taken by means of a vacutom in gynecologic position and the entire wound area was covered by the grafts (Fig. 5). The grafts were compressed by flavinated cotton, secondary defects were treated with tullegras. A transfusion of 500 ml blood A+ was administered during the operation.

In the days after the operation Chloramphenicol was administered, plasma was infused daily, as well as solutions of glucose with saline and C B vitamins. Five small transfusions of blood were administered during the following 3 weeks.

The course of healing was normal. The greater part of the grafts took well, only on a few places small necrosis of the graft arose. They were excised and the remaining granulation areas were epithelised secondarily by means of Thiersch' grafts. The patient was dismissed healed after two months. The successful result of the operation is demonstrated on Fig. 6.

Now the patient has been healed for a year already, she has no complaints, feels fit and works in her original occupation as a sales assistant.

The histological finding: From a common base long papillomatous processes grow densely pressed to one another, formed by very thin soaked connective tissue with multiplied and enormously dilated blood capillaries,

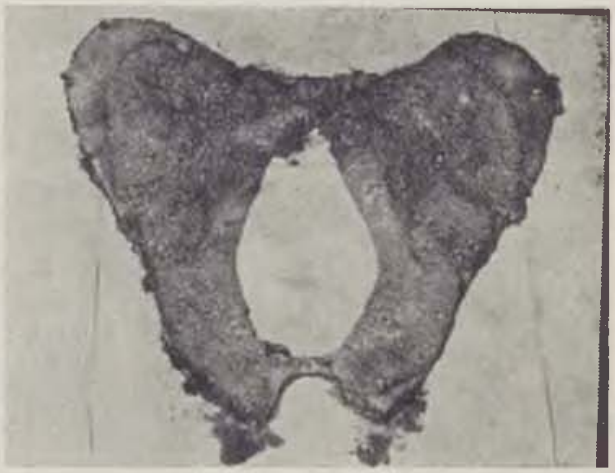


Fig. 3. Condition after excision of vulva and adjacent surroundings. — Fig. 4. Surgical preparation

Fig. 5. Wound area after excision covered by dermoepidermal grafts. — Fig. 6. Result of operation after 2 months — after healing.

overfilled with blood. Mainly in the superficial parts there are beds of dense lympho-plasmocytary infiltrate, in places with an admixture of neutrophillic leucocyte. The superficial epithelium is atrophic and in places formed by 3—4 layers of epidermal cells, in places affected by decomposing decay. The spaces between the finger-shaped processes are filled with masses of swelled horny substance, fibrin and detritus.

DISCUSSION

The basic skin disease in our patient is ichthyosis linearis circumflexa. It is a very rare disease which was for the first time described in 1949 by Comèl (1). Approximately 28 cases have been reported in world literature so far, of these one in the ČSSR [Rotschild, Růžička and Jorda (6)]. It is genodermatosis, which starts usually immediately after birth or in early age and with the exception of the head and the acral parts of the extremities, it affects the entire body surface. It manifests itself by very characteristic beds of fragile and desquamating hyperkeratosis, which heals centrally, whilst the border of several mm width proceeds very rapidly to the periphery, so that by migration and merging of the numerous beds form bizarre and changing garlandic and grained reliefs of different size and various shape. Of other manifestations attention should be drawn to occasional attacks of exsudative changes and formation of blisters, madidans and possibly associated infection. The manifestations resist any type of therapy.

Three years ago Schnyder and Wiegand (8) described in women with characteristic manifestations of Comèl's dermatosis, massive papillomatous changes in the anogenital regions, which — according to the authors — had never been reported in this disease before. We were interested in this report because our patient's condition was similar. We are dealing with the dermatologic problems elsewhere in detail (7). The circumgenital papillomatosis spread in our patient gradually to such considerable extent and caused the

patient so much suffering that her condition made surgery imperative. We have not met in the available literature with such extensive vulvar excision. By removing the papillomatously changed skin in the area of vulva, mons pubis, the adjacent internal surfaces of the thighs and the perianal region and by covering the defects by free dermoepidermal grafts we succeeded in relieving the patient of enormous discomfort and affording her the possibility to take up again her social position.

CONCLUSION

The main purpose of this report was to demonstrate the extensive excision of vulva and the possibility of reconstruction of the vulva by means of plastic surgery.

SUMMARY

The authors demonstrate a rare case of massive papillomatosis affecting the vulva and the adjacent surroundings in a patient with ichthyosis linearis circumflexa. The tissue removed by unusually extensive vulvectomy, was replaced by the former of the two authors by means of free dermoepidermal grafts.

RÉSUMÉ

Une vulvectomie étendue faute d'un papillomatome de région génitoanale

J. Krenar, V. Sedláček

Les auteurs présentent un cas rare d'une papillomatose très étendue dans la région de vulve et ses allentours dont était atteinte une malade souffrant de ichthiosis linearis circumflexa. Le tissu enlevé par une vulvectomie à l'excès imprévu a été remplacé par le premier auteur par des transplants dermoépidermaux libres.

ZUSAMMENFASSUNG

Ungewöhnlich umfangreiche Vulvektomie wegen genitoanaler Papillomatose

J. Krenar, V. Sedláček

Die Autoren demonstrieren einen seltenen Fall massiver, die Vulva und das anliegende Gebiet befallender Papillomatose bei einer Kranken mit ichthyosis linearis circumflexa. Das durch ungewöhnlich umfangreiche Vulvektomie entfernte Gewebe ersetzte der erste von den Autoren mit freien Transplantaten aus dermoepidermalen Pfropfen.

RESUMEN

Vulvectomia extraordinariamente extensa para papillomatosis genitoanalis

J. Krenar, V. Sedláček

Los autores demuestran un caso raro de la papillomatosis masiva que afecta la vulva y los alrededores contiguos en una enferma con ichthyosis linearis circumflexa. El primer de los autores reemplazó el tejido eliminado por la vulvectomia extraordinariamente extensa con los injertos libres de los injertos dermoepidermales.

REFERENCES

1. **Comèl N.**: Dermatologica (Basel), 98; 133, 1949.
2. **Čečuk L.**: Acta Chir. plast., 11, 4; 296, 1969.
3. **McGregor I. A.**: Brit. J. Plast. Surg., 15; 302, 1962.
4. **Krenar J.**: Plastická chirurgie v gynekologii, Praha SZN, 1968.
5. **Robinson F.**: Brit. J. plast. Surg., 15; 293, 1962.
6. **Rotschild L., Růžička J., Jorda V.**: Čs. Derm. 39 : 162, 1964.
7. **Sedláček V., Krenar J.**: Hautarzt (in print).
8. **Schnyder U. W., Wiegand, K. K.**: Hautarzt 19 : 494—499, 1968.
9. **Willams S. B.**: Brit. J. plast. Surg., 22, 1, 4, 1969.

Dr. J. Krenar, CSc., Brno, Trávníky 49, Czechoslovakia

The 12th Latin American Congress of Plastic Surgery and at the same time the 9th Brasilian Congress of Plastic Surgery will be held in Sao Paulo (Brasil), Hilton Hotel from January 30 to February 4, 1972.

For information write Dr. Ricardo Baroudi, Av. Barao de Itapura, 1111, 13100 — Campinas — SP — Brasil.

The Department for Burns, Clinic for Plastic and Reconstructive Surgery and the Radiological Clinic of the Charles University, Prague (Czechoslovakia)

CURLING'S ULCER

R. VRABEC, J. KOLÁŘ, B. DRUGOVÁ

INTRODUCTION

Of those complications occurring in the postburn period gastrointestinal ulcerations (Curling's ulcers) remain among the most serious. An extensive review of the world's literature on this subject matter and our own experience suggest that they are the next most frequent cause of death in cutaneous burns. Sepsis continues to be the first and shock the second most frequent lethal complication. Increased attention is paid to this problem in last years. All available clinical data are collected to form a valuable basis for a definite evaluation of the actual risk, pathogenesis and therapy of these complications. Because our clinical and autopsy material is one of the most extensive in the world's medical literature, followed immediately by the series of 352 deaths reported by Foley (1969) from the United States Army Institute of Surgical Research we allow us to present the following report on this subject matter.

OWN RESULTS

At the Burn Care Unit of the Prague Clinic for Plastic and Reconstructive Surgery all burns, scalds and electrical injuries are hospitalised which need intense medical care and reconstructive surgery. Our report encompasses the period from 1953 up to the end of 1970. Case histories of 10.477 patients have been reviewed with respect to complications in the skeletal and gastrointestinal system. The main basis for this survey on Curling's ulcer are 377 consecutive burn deaths. Twenty-nine positive findings (7.7% of autopsied material) are thus verified by autopsy.

In table 1 the distribution according to the sex and age of patients is given.

Table 2 concerns the grading of the degree of burn along with percent of body surface burned in our patients:

In the gastrointestinal tract there have been 11 solitary and 18 multiple ulcerations. The solitary Curling's ulcer occurred seven times in the stomach and four time in the doudenum; thirteen multiple lesions have been found in the stomach, once the ulceration occurred in the stomach and duodenum simultaneously and four times in the stomach and the colon.

Ten patients died within the first postburn week: the bulk of ulcers found here — nine-have been located in the stomach and one in the duodenum; in the last case

the upper jejunum was the site of a bleeding ulceration. In the second week three gastric, two doudenal and one colonic ulcers have been found. In the third and fourth week seven gastric, one duodenal and one colonic ulcer; after the first postburn month there have only been two gastric and one colonic ulcerations. So the onset of those complications mostly spanned the first two weeks postburn.

About seventy per cent of these patients died with sepsis, but septicaemia developed with the same frequency in patients without Curling's ulceration. The main bacterial findings in the septic cases have been: Pseudomonas, Pyocyaneus, Proteus, Streptococcus β-haemolyticus.

Tab. 1

Age (Years)	Men		Women	
	Total	Positive	Total	Positive
Up to 15	21	3	7	2
16—30	29	3	7	1
31—50	43	4	18	2
51—65	44	2	42	5
Over 66	56	3	110	1
Total	193	15	184	14

In three patients the gastrointestinal complications have been the immediate cause of death, with massive hemorrhage in two and perforation with peritonitis and paralytic ileus in one instance. In all other instances septicaemia or traumatic shock have been the immediate cause of death. From all patients with Curling's ulcer only in two instances positive tests for occult bleeding in the stool and blood in the gastric content have signalized gastrointestinal bleeding. In all remaining patients the clinical

Tab. 2

Burned Area (Per cent)	Men		Women	
	Total	Positive	Total	Positive
Less than 20	60	4	60	2
21 to 40	34	3	37	2
41 and more	99	8	87	10
Total	193	15	184	14

symptoms of gastrointestinal disease have not been apparent and the course of the disease has been dominated by other symptoms of the thermal injury. No operative abdominal intervention was tried in our patients with bleeding ulcerations because their general condition was not suitable for abdominal surgery.

Among all other injured patients who have recovered from their burns, only seven gastroduodenal ulcerations with positive clinical symptoms have been encountered. Although they had no gastrointestinal symptoms before the injury in no case the causal connection with the preceeding burn could be proven. Because the most ulcerations

of the Curling's type have been asymptomatic even in the bulk of patients dying of their thermal injury, we do not believe that this incidence among living patients is representative for the true risk of Curling's ulceration in the burned population. No systematic rentgenological investigations have been tried in asymptomatic living postburn patients.

DISCUSSION AND COMMENTS

Extensive reviews of clinical material published in the world's literature in several last years (Sevitt 1967; Foley 1969; Pruitt et al. 1970) give quite different evidence of Curling's ulcerations in burned patients. Whereas the data from the material of Sevitt (1967) are nearby identical with ours, the data of Pruitt et al. (1970) from the United States considerably exceed this average. The incidence is given by 25 per cent and in the series of Foley (1969) the autopsy incidence was 34 per cent. At present, there is no sufficient explanation for this big scatter of data. Some differences could be conditioned by the different extent of burns and age of the patients as well as choice of material, which in no case is representative enough for the burns in the whole population. But even if serious or autopsied cases are considered only, such differences still do exist. So the list of important modifying factors must be much more broader. One of the possible moments could be the administration of corticoids during the anti-shock therapy which can rise the incidence of peptic ulcerations. It is also the opinion of De Weese (1967) that some of the factors involved in the pathogenesis of Curling's ulcers are similar as after administration of exogenous steroids.

In the recent report of Pruitt et al. (1970) excellent review is given about the theories proposed by various authors about the circumstances of occurrence of Curling's ulcerations. The age span ranges from several weeks to the senium, but children and young people seem to be preffered by this complication. The commonest moment of occurrence of ulcerations are the first two postburn weeks. Although it seems from the data given by Pruitt et al. (1970) and from our own search in the literature (the whole list cannot be given here because of lack of space) that sex incidence of Curling's ulcerations is predominantly male (Moncrief 1964) we were not able to confirm it in our material, and even not in the collected data from the literature. This opinion of other authors partly stems from the error of small clinical material and from the fact that men become more often victims of burns than females.

In accordance with other authors (Abramson 1964; Moncrief et al. 1964; Artz et al. 1967; Kopecký et al. 1969) we also have observed an increased incidence of Curling's ulcerations in children and adolescents. In other materials this incidence is even higher but this could partly be due by the fact that not all seriously burned children have been hospitalized in our Department only and the majority of patients reported here are in the presenile and senile age. We have not been able to find any connection between the sepsis and the Curling's ulcer although sepsis has been repeatedly incriminated as an etiologic factor. It may indoubtedly be an important secondary factor but its primary influence has not been established.

With respect to the location of the Curling's ulcer there is a distinct prevalence for the lesser curvature of the stomach and the duodenal bulb. Polytope ulcerations sometimes occur in both these parts simultaneously, but in other cases the gastric mucosa is the site of multicentric erosions and ulcerations. The next site of predilection is the lower third of esophagus. But we have not found any ulceration at this site, only inflammatory changes accompanying reflux from the stomach. Ulcerations in the intestines mostly accompanied ulcerative and necrotizing enterocolitis. Polytopic occurrence is comon in up to 50 per cent of Curling's ulcerations. Also in our material more than 62 per cent of Curling's ulcerations have been polytopic.

In most reports the unfavourable fact is stressed that the clinical symptomatology of gastrointestinal ulcerations is not characteristic and that other symptoms may divert attention from them. Also the simple matter of communicating with the patient is hindered by the cloudy sensorium. Swollen burned abdominal skin obscures palpation for peritoneal irritation and many other clinical signs are not totally reliable. There are in fact two characteristic symptoms only: bleeding from the gastrointestinal tract and paralytic ileus with abdominal distention and peritonitis.

Bleeding is at least twice or thrice as often as perforation and may be dramatically sudden. Both mostly have their source in the duodenum.

In all other cases the main symptoms are governed by shock, septicaemia and other symptoms of serious burn. Special, e. g. radiodiagnostic investigations of the gastrointestinal tract are inaccessible for a long time until the patient is partly healed from injuries of the skin and the risk of infection is lowered. Native radiographs of the abdominal cavity can encounter intestinal paresis or paralysis or free air in the peritoneal cavity in perforations of the tract (Kozina and Kaem 1965). All common investigations of hematocrit, blood counts, blood pressure measurements and other help to prove the loss of blood and are helpful for decisions about the extent of supplementary blood transfusions and infusions.

We have not been able to find any important moment which could help to explain the occurrence of Curling's ulceration in our patients. A lot of theories tries to do it (Brihaye et al. 1966; Foley 1969; Pruitt et al. 1970), but no of them is able to explain sufficiently all the moments. Stress in a burn causes a chain reaction involving the hypothalamus, anterior pituitary and the adrenal cortex. The stimulation of vagus nerve and therapy with corticoids which are known to support peptic ulcerations even in patients without burns are the widely discussed possible causes of these ulcers. They stimulate the gastric secretion. But only several patients with burns have a real hypersecretion. Perhaps a relative hypersecretion may also be sufficient which arises by reduced production of gastric mucin and lowering the protective barrier of the gastric mucosa. Neural disturbances may cause peptic ulceration in the same manner like in Cushing's ulcers in diseases of the midbrain. Altered local circulation in the wall of the viscus and stomach can be caused by hemoconcentration, embolism,

sludging or vascular spasms and will cause inappropriate supply of the mucosa with oxygen. The clinical impression had existed that there was a high incidence of concomitant occurrence of burn sepsis and acute gastrointestinal ulceration, but there is no clinical or morphological basis for a cause and effect relationship between sepsis and the gastrointestinal ulceration. The role of intoxication by toxic products released from burned tissues of the body may be another important factor. Several different mechanisms probably cause these lesions by simultaneous interaction. The main disadvantage of all these theories is that they do not explain all the cases of Curling's ulcerations — and although it sounds paradoxically — they do not explain why the true occurrence of Curling's ulcers is not much more higher than it actually is, because many patients have the same disturbances but without gastrointestinal complications.

This uncertainity in explanation of the physiopathology of Curling's ulcerations in burned patients seriously hinders the preventive and therapeutic approach to them. The current program of management of gastrointestinal ulcerations and bleeding in burned patients can be summarized as follows:

The patients are placed on antacid regimen, stool specimens and the gastric content are examined daily for occult blood. Tarry stools, coffe-ground emesis or abdominal distention are indications for gastric suction and anticholinergic drugs. This initial trial of medical treatment is indicated even in massive upper gastrointestinal hemorrhagies; immediate blood replacements should keep pace with the loss. Gastric hypothermia after evacuation of the content should be tried. When the bleeding does not stop within 48 hours, or extensive blood replacements are necessary, early operative intervention should be carried out in these extremely ill individuals, if their condition does allow it. A high gastric resection is the most reliable operation of choice; simple closure of the ulcer, with an omental patch is performed in patients who have perforations. Pyloroplasty, vagotomy and ligation of the artery in the ulcer bed may be elected in some patients.

The results of conservative treatment are mostly very poor and disappointing. But also in those institutes, where active approach is prefered, the survival rates do not reach 30 per cent (Pruitt et al. 1970). But without any intervention the most patients would die.

SUMMARY

The results of 377 autopsied burn cases are summarized with respect to the occurrence of Curling's ulcers. Twenty-nine (7.7 per cent) have been found in this material. The most have been encountered at post-mortem examinations, in only three instances the ulceration was the cause of death by exsanguination or perforation with peritonitis. The conditions of the occurrence of these ulcerations are discussed briefly. Present theories do not explain all aspects sufficiently and also the results of conservative and surgical management still remain unsatisfactory.

RÉSUMÉ

La maladie de Curling-ulcérations posttraumatiques chez les brûlés

R. Vrabec, J. Kolář, B. Drugová

Les auteurs présentent une groupe de 377 morts en brûlures dont on a pratiqué l'autopsie. Celle-ci a montré la prêsence des ulcérations de Curling en nombre de 29 cas, ci que présente le pourcentage de 7,7 %. La plupart a été trouvée au cours de l'autopsie, dans trois des cas seulement l'ulcération elle-même était cause de mort en suite d'haemorrhagie ou bien encore de perforation suivie de la péritonite. Les auteurs discutent en bref les conditions menant chez ces ulcérations de même que leur causes. Les théories jusqu'alors connues n'expliquent pas assez tous les avis et tous les résultats de la thérapie conservative. En plus, la thérapie chirurgicale elle-même ne donne pas des résultats satisfaisants.

ZUSAMMENFASSUNG

Das Curlingsche Geschwür

R. Vrabec, J. Kolář, B. Drugová

In der Arbeit werden die Ergebnisse aus 377 Sektionen zusammengefasst, mit Rücksicht auf das Auftreten von Curlingschen Geschwüren. In diesem Sektionsgut sind 29 Fälle (7,7 %) gefunden worden. Die meisten wurden erst bei der postmortalen Untersuchung entdeckt, nur in drei Fällen war die Ulzeration eine Todesursache durch Exsanguination oder Perforation mit Peritonitis. Keine von bestehenden Theorien ist imstande alle Aspekte restlos zu klären und auch die Ergebnisse der konservativen und chirurgischen Behandlung sind stets unbefriedigend.

RESUMEN

Úlcera de Curling

R. Vrabec, J. Kolář B. Drugová

La obra presenta un informe sobre 377 disecados quemados y de la presencia de la úlcera de Curling en ellos. Se encontraron 29 (7,7%). La mayor parte se encontró sólo durante el reconocimiento de disecación, solamente tres veces fue la ulceración la causa de la muerte por el desangramiento o por la perforación con la peritonitis. Cortamente se discuten las condiciones en las que aparecen y las causas. Las teorias presentadas al mismo tiempo no explican con suficiencia todos aspectos y tampoco ni los resultados de la terapia conservador ni los del tratamiento quirúrgico son siempre satisfactorios.

REFERENCES

1. **Abramson D. J.**: Curling's ulcer in childhood. Review of the literature and report of five cases. Surgery 55, 3 : 321, 1964.
2. **Artz C. P., Fitts C. T.**: Gastrointestinal ulcerations associated with central nervous lesions and with burns. Surg. Clin. Amer. 46, 2 : 309, 1967.
3. **Brihaye J., Kiekens R., Van der Voort G.**: Les ulcérations digestives dans les états de stress. Acta chir. belg. Suppl. 1, 1966.

4. **DeWeese M. S.**: Special burn problems. Gastrointestinal ulceration. J. Trauma 7, 2 : 115, 1967.
5. **Foley F. D.**: Fatal complications of burns. Amer. J. clin. Pathol. 52, 1 : 1, 1969.
6. **Kopecký J., Kalina J.**: Curlingův vřed v dětském věku. Acta Chir. orthop. Traum. čech. 36, 6 : 366, 1969.
7. **Kozina A. V., Kaem R. J.**: Acute perforating ulcers of the gastrointestinal tract in burns. Chirurgia 41, 6 : 59, 1965.
8. **Moncrief J. A., Switzer W. E., Teplitz C.**: Curling's ulcer. J. Trauma 4, 4 : 481, 1964.
9. **Pruitt A. B., Foley F. D., Moncrief J. A.**: Curling's ulcer. Ann. Surg. 172, 4 : 523, 1970.
10. **Sevitt S.**: Duodenal and gastric ulcerations after burning. Brit. J. Surg. 54 1 : 32, 1967.

Doc. dr. R. Vrabec, Praha 2, Legerova 63, Czechoslovakia

Indian Journal of Plastic Surgery

The association of plastic surgeons of India is publishing its journal „Indian Journal of Plastic Surgery" under the editorship of prof. R. N. Sinha, Rajindernagar, Patna — 16 (India) since, 1968.

This journal is published bi-annualy (july—december) for further information regarding subscription and other matters kindly write to: — dr. Rajinder Singh Thind Assistant Editor & Business Secretary Indian Journal of Plastic Surgery 9/E Medical Enclave, Patiala (India).

Comenius University Medical Faculty Department of Plastic Surgery,
Bratislava (Czechoslovakia)
Head prof. Dr. Št. Demjén

LOCAL RESPONSE BY ORGANIZM TO THE SILICON IMPLANTE IN EXPERIMENT

M. BROZMAN, L. HOSTÝN

The application of various plastic materials as implantation materials for medical purposes has increased in the past ten years considerably. It proved satisfactory in cardiosurgery (4), in ocular medicine (3), neuro-surgery (2), especially however in plastic and reconstruction surgery (1, 5, 6, 7). Because of initial lack of success, we refused to use it for quite some time. The fact that continuously new material is being mentioned in literature, tends to prove that interest for it exists and that certain good results had been

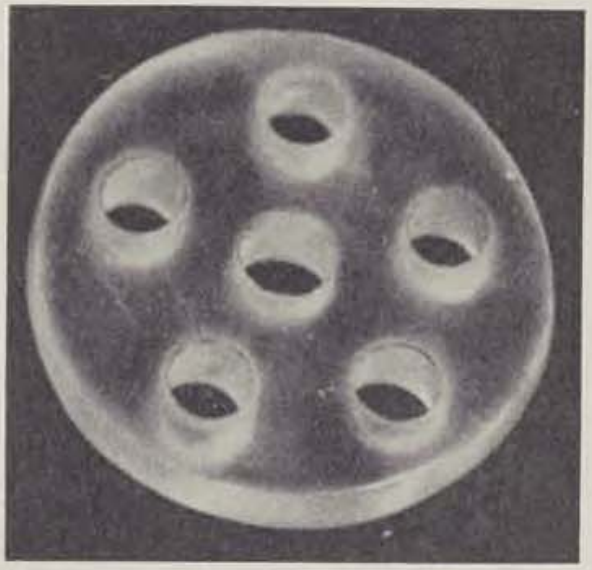


Fig. 1

achieved. One of the most frequently used materials is silicon rubber because of its high resistance towards the surrounding tissue and due to its low tissue reaction.

In our study we tested the behaviour of the surrounding tissue towards implanted silicon rubber.

MATERIAL AND METHODS

Solid silicion rubber produced at the Research Institute of Cables and Isolating Material in Bratislava, was used for the investigation.

In a series of experiments we implanted subcutaneously and into gluteal muscles, solid silicon in form of a circle of 2 cm ∅, for a period of 21 days

Fig. 2

up to 30 months (Fig. 1). The experiments were carried out in rabbits in a total number of 24 experiments. Just before the experiment, the implantates were sterilized in the autoclave. The sterility tests were negative. The entire operation was carried out under strictly sterile conditions. We extirpated the

Fig. 3

Fig. 4

silicon and the surrounding tissue in a time period of 21 days and then every 6 months. We placed the material immediately into 10% Formalin. For technical reasons the silicon had to be removed before the histological processing. The histologic cuts were stained with haematoxilineosin and Van Gieson.

RESULTS

In all silicon implantantes the take occured without complications. The sutures took primarily. Examination by macroscope and palpation disclosed no reaction on part of the vicinity. On basis of the histologic examination we

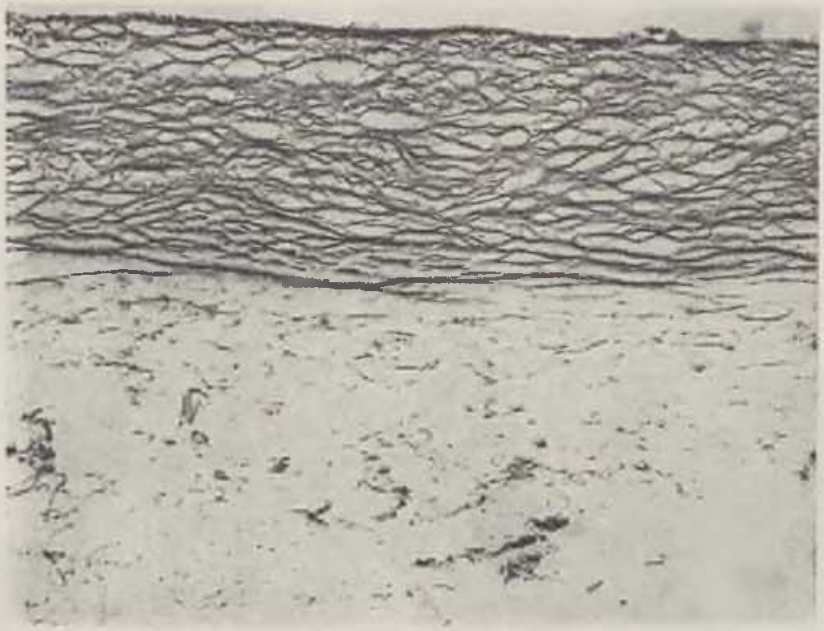


Fig. 5

are able to claim that the silicon implatante is surrounded by thin connective tissue (Fig. 2), which changes in longer time intervals to rigid collagen tissue without any pathologic reaction (Fig. 5, 6). We observed no significant formation of granulation tissue, nor any gigantic cellular reaction. The empty spaces in the perforations of the silicon implantate are at first filled by fatty tissue which in a further period is substitued by collagen tissue (Fig. 3, 4).

CONCLUSION

On basis of macroscopic studies and histologic examination, we believe that the silicon rubber applied, does not lead to pathologic reaction on part of the experimental animal. After packing the implatate with thin connective tissue it gradually changes to solid collagen connective tissue and the implantate remains firmly enclosed in the mature case of connective tissue.

Silicon rubber appears to be free of toxicity and adding to this fact the good reat resistance which from the point of sterilisation is of no lesser importance, we possess a material which may be widely applied.

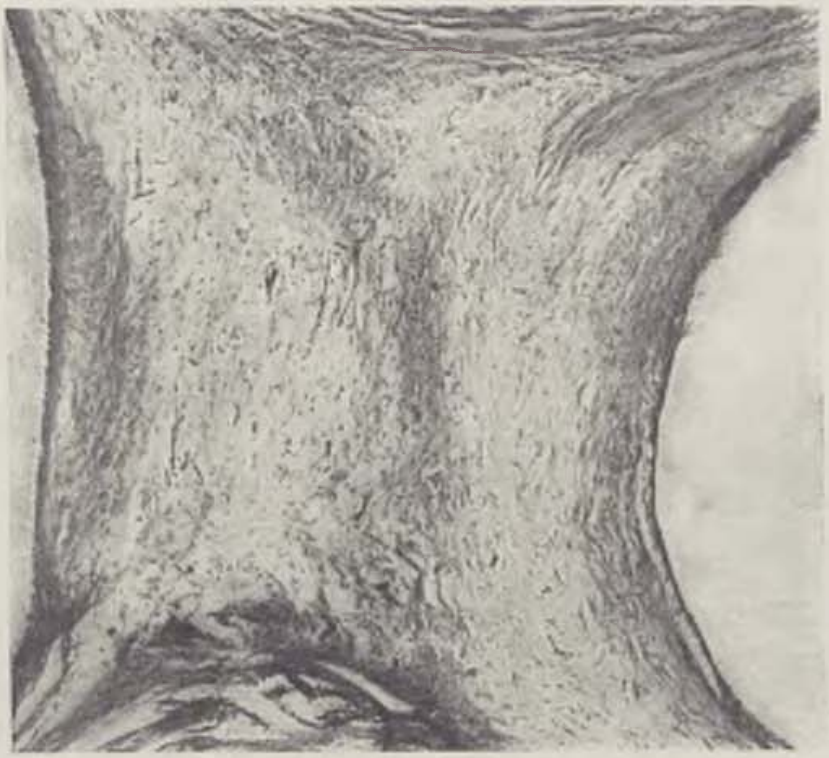


Fig. 6

SUMMARY

In 24 experiments we studied in rabbits, the local reaction to silicon implatante introduced subcutaneously and into the muscle. The histologic examination proves the implatante to be packed with connective tissue without pathologic reaction.

RÉSUMÉ

La réponse locale de l'organisme respectif à l'implantation du silicon dans l'expériment

M. Brozman, L. Hostýn

Les auteurs ont étudié dans une série de 24 des expériments sur les lapins la réaction locale à l'implantation du silicon sous la peau et dans le muscle. Les recherches histologiques ont montré l'implant enveloppé dans le tissu conjonctif sans la moindre réaction pathologique.

ZUSAMMENFASSUNG

Lokale Antwort des Organismus auf ein Silikonimplantat im Versuch

M. Brozman, L. Hostýn

In 24 Versuchen untersuchten wir an Kaninchen die lokale Reaktion auf ein subkutan und intramuskulär eingeführtes Silikonimplantat. Die histologische Untersuchung beweist, dass das Implantat mit Bindegewebe ohne pathologische Reaktion eingehüllt wird.

RESUMEN

Reacción local del organismo al implante de silicona en el experimento

M. Brozman, L. Hostýn

En 24 experimentos observabamos en los conejos la reacción local al implantate de silicona introducido debajo de la piel y al músculo. El examen histológico comprueba que el implante es recubierto con el ligamento sin reacción patológica.

REFERENCES

1. **Blocksma, R., Braley, S.:** The Silicones in Plastic Surgery. Plast. reconstr. Surg. 35 : 366, 1965.
2. **Anderson, F., Geiger, L.:** Craniosynostosis. J. Neurosurg. 22 : 229, 1965.
3. **Browning, C.:** Alloplast Materials in Orbital Repair. Amer. J. Ophthal. 63 : 955, 1967.
4. **Raible, D., Keller, D., Pierie, W., Koorajian, S., Partridge, E.:** Elastomers for Use in Heart Valves. Presented before the American Chemical Society Meeting, San Francisco, May 1966.
5. **Zarem, H.:** Silastic Implants in Plastic Surgery. Surg. Clin. N. Amer. 48 : 129, 1968.
6. **Karfík, V., Smahel,J.:** Subcutaneous Silicone Granuloma. Acta Chir. plast. 10, 4, 328 : 1968.
7. **Rees, T. D., Platt, G., Ballantyne, D. L.:** An Investigation of Cutaneous Response to Dimethylpolysiloxane (Silicone Liquid) in Animals and Humans. Plast. reconstr. Surg. 35 : 131, 1965.

M. Brozman, Partizánska 1, Bratislava, Czechoslovakia

Medical Faculty of Hygiene, Charles University, Prague (Czechoslovakia)
Clinic of Plastic Surgery
Head prof. H. Pešková, M. D., DrSc.
Faculty of General Medicine, Charles University, Ist. Dental Clinic
Head prof. J. Toman, M. D., DrSc.

SUPERACRYLAR DILATOR OF URETHRA RECONSTRUCTED ACCORDING TO NOVÉ - JOSSERAND

M. FÁRA, V. HABERZETTEL

The result of the Nové-Josserand operation in the reconstruction of the penial part of the urethra in hypospadia is threatened by two complications, even if the primary take of the grafted skin was satisfactory:

a) shrinking of the graft (this danger lasts for approximately 6 months) and

b) secondary infection, which succeeds to penetrate the graft even through small abrasions, affecting the entire membrum.

Stenosis of the urethra due to shrinking of the graft, is prevented by long-term insertion of the dilator. At first the dilator is only removed for a few minutes sufficient for the exchange. This interval is later prolonged according to the condition of the urethra and the decreasing tendency to shrink. However, practically every patient is obliged to have the dilator temporarily fitted till the last operational stage when the hypospadic orifice is connected to the proximal end of the reconsructed part of the urethra.

So far we used sectors of the catheter for this purpose, (tubes made of plastic or stainless steel) which were fitted with caps at both ends.

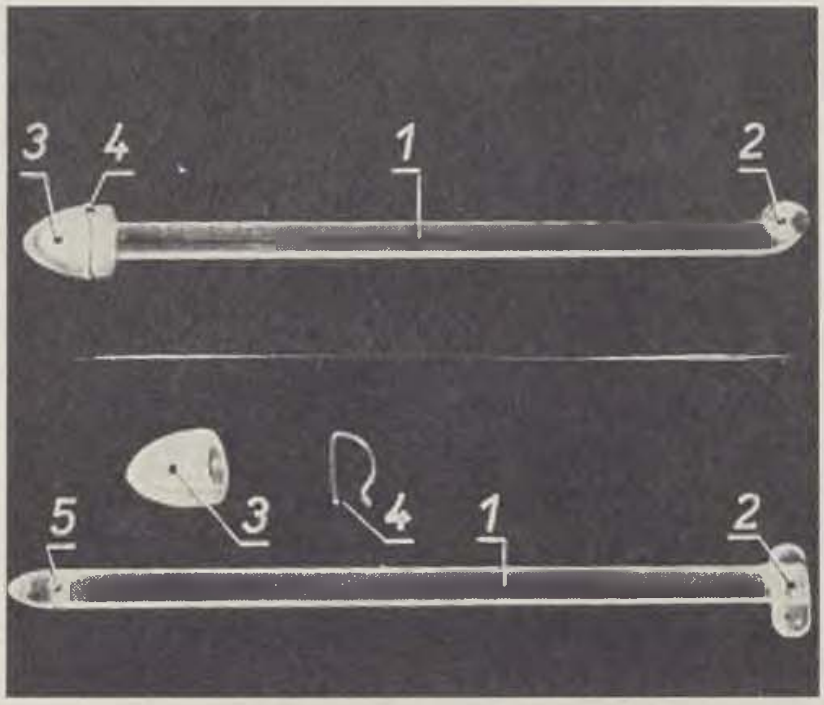
All these dilators had besides unwanted flexibility (catheter) or considerable weight (metal tube) one common disadvantage, in that they — though smooth enough — caused microtraumata when they were introduced into the new urethra. These microtraumata were then easily secondarily infected. The hazards of causing infection easily again, resulted from the design of all these dilators. They trapped in their more (in catheters) or less (in metal tubes) open cavity, any type of infection from the underwear and hands of the patient which could grow and easily pass into the urethra. A further considerable disadvantage of the former dilators wat that they made the downward position of the penis impossible.

We therefore undertook the task to design a dilator which would not be hollow and sufficiently smooth as not to cause any abrasion when being introduced. Furthermore it had to be made of light material and furnished with an

easily fixable hygienic stop device so as to prevent the tube to slip out. Its proximal end should not prevent the penis to change position.

The material suitable for producing such a dilator, appeared to be SUPER-ACRYL which is currently used in stomatology.

The dilator consists of a cylindrical rod of required length usually of 7 mm (1) thickness, which is terminated on one end by a short cylinder (2)



Urethral dilator. A b o v e : folded, side-view, B e l o w : unfolded, view from above — 1 - rod, 2 - cylinder, 3 - cap, 4 - spring, 5 - channel

placed diagonally and excentrically to the axis of the rod. The other end of the rod is rounded off and furnished with a removable cap (3) which is secured by a metal spring (4). On one end the spring is passed through a channel (5) drilled into the tip of the rod and the cap; the other end of the spring embraces the cap.

When the cap has been removed, the dilator is introduced by its rounded-off end into the proximal opening of the reconstructed sector of the urethra so that the cross cylinder at the end of the rod is averted from the urethra and rests at its edge. The rounded-off end of the rod protrudes then from the distal end of the urethra and it is secured against slipping out again, by putting on the cap and passing the spring through.

The dilator is absolutely smooth, shiny and may be easily cleaned and disinfected by placing it into any antiseptic (we use Famosept).

SUMMARY

A new type of dilator for the urethra, reconstructed according to Nové-Josserand, is made of Superacryl. It is quite smooth, very light, it is furnished at its distal end with a removable cap, easy to fix and preventing the dilatator to slip out. The firm stop at the opposite proximal end does not prevent the penis to change its position.

RÉSUMÉ

Un dilatateur de l'urèthre superacrylique, construé pour les opérations réconstructives de l'urèthre d'après Nové-Josserand

Fára, Haberzettel

Un nouveau type de dilatateur de l'uréthre, ayant subie l'intervention de Nové-Josserand, est fait du superacryle. Il est très souple, léger et sur le bout distal, il y a un taon facilement fixable, qui peut être enlevé et qui empêche sa perte. Un taon fixe sur le bout proximal n'empêche pas la position verticale de la tige.

ZUSAMMENFASSUNG

Superacryldilatator für die nach Nové-Josserand wiederhergestellte Harnröhre

Fára, Haberzettel

Der neue Typ eines Urethraldilatators für Harnröhren, die nach dem Verfahren von Nové-Josserand wiederhergestellt wurden, ist aus Superacryl hergestellt. Der Dilatator ist vollkommen glatt, sehr leicht und am distalen Ende hat er einen leicht fixierbaren abnehmbaren Anschlag, der sein Herausfallen vorbeugt. Der feste Anschlag am entgegengesetzten, proximalen Ende behindert nicht die senkrechte Lage des Penis.

RESUMEN

Dilatator de „Superacryl" del uréter reconstruido según Nové-Josserand

M. Fára, V. Haberzettel

El nuevo tipo del dilatador del uréter reconstruido según Nové-Josserand es fabricado de „Superacryl". Es completamente liso, muy ligero y en el extremo distante tiene un tope amovible que puede fijarse sin dificultad y evita la caída. Un tope firme en el extremo opuesto próximo no evita la posición vertical del pene.

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

F r a n t i š e k B u r i a n, the member of Czechoslovak Academy of Science, professor of Charles University in Prague, one of the pioneers of plastic surgery and its founder in Central Europe, passed away unexpectedly on 15th October 1965.

Till the last moment he devoted himself to his beloved work which during the last years was concentrated on research in clefts of the lip and palate.

He will be always remembered by his pupils and friends with love and gratitude.

The 17th september 1971 would be his 90th birthday.

The Polish Medical Weekly no. 48. volume XXV of 30. 11. 1970 is entirely dedicated to reports concerning problems of burns and it surveys clinical and laboratory experiences at the Clinic of Surgery at the Institute of Haematology in Warsaw. Its head, professor W. Rudowski wrote the introduction to the Number.

•

Nasilowski W., Roszkowski S. studied since the 2nd. week after injury changes of uropepsin and pepsinogen in 65 severely burned patients by the Mirsky-Hirschowitz method. They ascertained long lasting rise of both enzymes and they concluded that the phenomenon of intensified hypersecretion of glandular stomach cells may be related to the formation of Curling's ulcers. In a further article Bukowska D., Serafińska D. and Zientkiewicz W., report the results of a comparative study on the effect of different antiseptic preparations and antibiotics to bacterial flora in vitro. A group at the Institute of Pathologic Anatomy studied in 87 deceased persons organic changes induced by septicaemia and pyaemia.

•

W. Zietkiewicz reports in two articles good experience with the grafts prepared beforhand. He left the graft after removal for 24—48 hours on the donor site and transferred it only then to the granulation areas or prepared the grafts before transfer by imersion into hypotonic solution of antibiotics and antiseptics. Both means enabled him to improve grafting — in comparison to the control group — considerably.

•

Nasilowski W., Brudzyńska-Charowicz S. and Rudowski W., analyse 516 cases of facial burns, stressing the importance of increased nursing care with these patients. The same authors report in a further article the advantages of using mesh-skin-grafts. Nasilowski also reports good experience with the technically well designed bath tub of French origin, for bathing burned patients. The considerable difficulties and failures experienced by Brudzyńska-Charewicz S. in the treatment of burns which had not been grafted in due time, clearly speak in favour of the necessity and the advantages of early grafting.

•

Jastrzebski J. and Zienkiewicz K., publish their anaesthesiologic experiences, Nasilowski and Brudzyńska-Charewicz S. report the analysis of 105 patients above 60 years and stress the increased necessity of cooperation with internists and surgeons as well as special nursing care.

•

Before the historic article by Nasilowski on the development of the treatment of burns, Rusiniak L. and Szczepański M. give a report of comparatively extensive experience with the therapy of electrical burns.

•

The entire series of interesting comprehensive and yet brief articles confirms and proves the excellent work done by the whole group on such a difficult task as the treatment of burned patients and it will captivate all those working in this sector.

H. Pešková, prof. M. D., DrSc., Praha 10, Šrobárova 50,
Czechoslovakia

CONTENTS