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Acta Chirurgiae Plasticae is an international journal with a long-standing tradition respected by the professional public worldwide. It is published in English four times per year. The journal contains clinical, experimental and theoretic studies from the discipline of plastic, reconstructive and aesthetic surgery, surgery of the hand, craniofacial surgery, treatment of burns and allied surgical disciplines (traumatology, orthopaedics, gynaecology etc.). In the journal you will also find reviews, case-histories, innovations, comments, reports from study trips and congresses, reviews of books and various announcements.

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USE OF TWO MICROSURGICAL FLAPS IN ONE STAGE RECONSTRUCTIVE SURGERY

J. Veselý^{1,2}, V. Procházka², J. Válka¹, T. Mrázek¹, P. Santi³, P. Bertino³

¹Department for Plastic and Aesthetic Surgery, Brno

²Institute for Traumatology, Brno

³IST, Genova, Italy

SUMMARY

In the studied series of 167 free transfer two microsurgical flaps in one stage surgery were used in six cases. Two times latissimus + fibula in extensive defects of the tibia and soft tissues of the shin, two times forearm + forearm in isolated defects of the feet, in one case TRAMF + TRAMF for the reconstruction of both breasts and in one case of reconstruction of the penis and the urethra in a transsexual female to male. In this case three flaps were used - pedunculated rectus abdominis muscle and LAF for the reconstruction of the urethra and a sensitive flap from the forearm for the cover of both preceding flaps. The healing of all flaps was satisfactory and individual case records are described in detail and discussed.

ZUSSAMMENFASSUNG

Anwendung von zwei mikrochirurgischen Lappen bei der Rekonstruktion in einer Etappe

J. Veselý, V. Procházka, J. Válka, T. Mrázek, P. Santi, P. Bertino

Von insgesamt 167 freien Übertragungen wurden in 6 Fällen zwei mikrochirurgische Lappen bei der Rekonstruktion in einer Etappe angewandt. Die Lappen bestanden zweimal aus Latissimus + Fibula, bei ausgedehnten Verlusten der Tibia und der Weichteile des Unterschenkel, zweimal aus Unterarm + Unterarm bei isolierten Defekten der Füße, in einem Fall aus TRAMF + TRAMF bei der Rekonstruktion beider Brüste und in einem Fall der Rekonstruktion des Penis und der Harnröhre bei einem Transsexual zur Änderung des weiblichen in das männliche Geschlecht, mit Hilfe von 3 Lappen wurden 3 Lappen angewandt. Aus dem gestielten Muskel rectus abdominis und LAF zur Rekonstruktion der Urethra und des sensitiven Unterarmklappens zur Überdeckung beider höher erwähnten Lappen. Samtliche Lappen lieferten gute Erfolge Einzelne Fälle werden analysiert und erörtert.

Key words: microsurgery, multiple free flaps transfers

The use of several microsurgical flaps in one stage reconstructive surgery was reported mostly in simultaneous transplantations of toes to hands (1, 3, 4) and less frequently in combined transplantations of other tissues (2, 5, 6). Buncke described 50 multiple transplantations of various types.

Two microsurgical flaps in one stage surgery were also used in six patients out of our series of 167 investigated free transfers. As they consisted of various types of flaps it is considered interesting to present these case records in more detail.

Latissimus + fibula. In two males aged forty years were reconstructed extensive defects of the tibia and of soft tissues of the shin. The first patient had a defect of the tibia measuring 16 cm. Neurovascular bundles were preserved, he was operated upon 8 months after injury and skin

grafts were followed by a healing. The second case (Figs. 1-6) had a defect of the tibia measuring 14 cm and a missing neurovascular bundle within the tibialis posterior. The patient refused an amputation and insisted on the use of reconstructive surgery. In both patients was used an identical surgical procedure. The defect of the tibia was bridged with a vascularized fibula which was fixed, without the use of osteosynthetic material into both stumps of the tibia. The shin and the fibula were covered with the latissimus muscle which was harvested in its whole length. Vascular pedicles of both free flaps were anastomosed into two venous grafts sutured end to side to popliteal vessels. The length of the grafts was 21 cm in the first case and 15 cm in the second one. The vessels of the fibula were anastomosed end-to-end to the grafts and the vascular pedicle of the latissi-

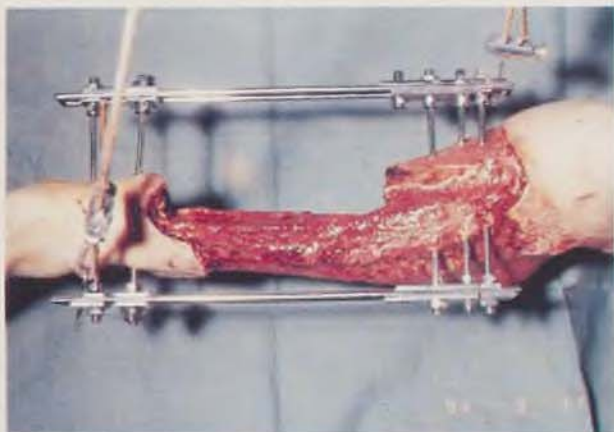


Fig. 1: Defect of tissues of the shin.

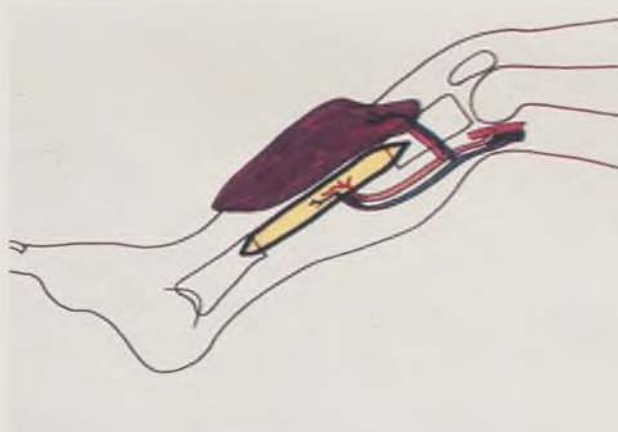


Fig. 4: Schema of vascular grafts and anastomoses.

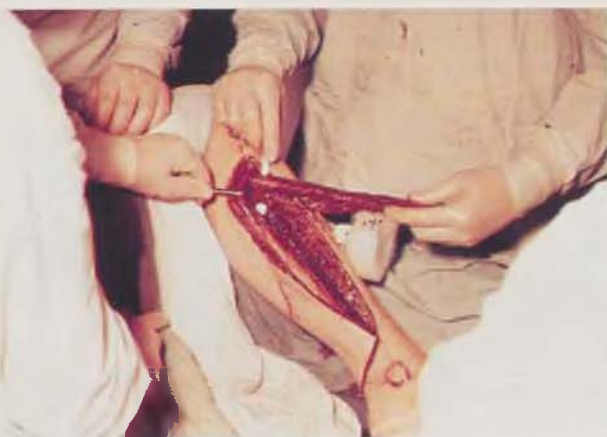


Fig. 2: Harvesting of a vascularized fibula.

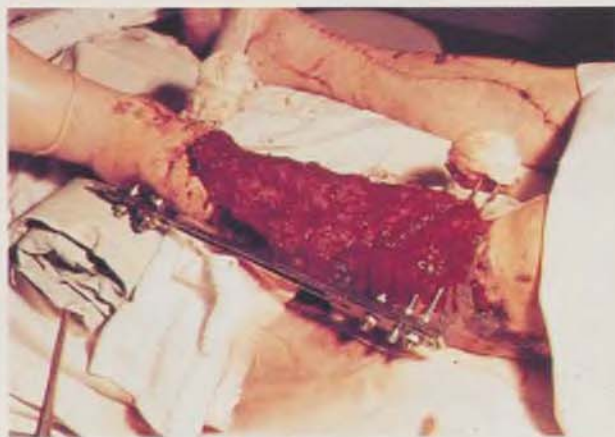


Fig. 5: After the suture of the fibula and latissimus.



Fig. 3: Harvesting of m. latissimus dorsi.



Fig. 6: After one year.

mus end-to-side. The healing of soft tissue was normal and uneventful, unlike the skeletal healing that was prolonged and a fracture of the fibula in the both patients occurred, in the first one in the diaphysis and in the second one over the junction of the both bones. The both episodes occurred at a time when the patients already walked and the affected extremity was exposed to weight-bearing (4 resp. 6 months after surgery). In the first case the healing of the fracture was complicated with the development of a pseudoarthrosis treated with external fixation under compression and subsequently with a plaster of paris bandage allowing walking. In the second case the fracture healed satisfactorily after the use of a fixator, and a subsequent plaster of paris bandage and orthosis. The duration of the treatment was 2 and 1.5 years.

Forearm + forearm. In two traumatologic patients were transferred fasciocutaneous flaps to their feet. In a boy aged four years a fracture of the thigh was fixed with plaster of paris which resulted in the development of decubitus in two sites with an exposure of tendons - one decubitus developed on the dorsum of the foot and the second occurred above the Achilles tendon of the same extremity. The second patient had unhealing defects after the amputation of chilblained toes of both feet in Lisfrank's joints. In both cases the flaps were harvested simultaneously and sutured into the defects. The healing was without any complications.



Fig. 7: The chest after bilateral mastectomy.

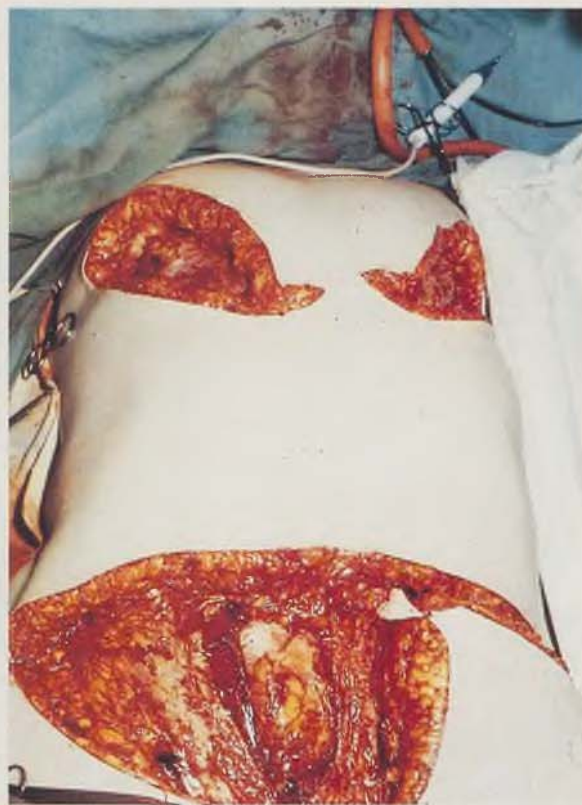


Fig. 8: Both TRAMF transferred for reconstruction of the breasts.



Fig. 9: One year after surgery.

TRAM + TRAM. In female patient aged 45 years after bilateral mastectomy was performed a reconstruction of both breasts with the use of TRAMF with a pedicle of the epigastrica inferior profunda sutured on both sides to the vasa mammaria (Figs. 7-9). The healing was without complications.

LAF + forearm. The six patient was a transsexual female to male operated upon with our cooperation at the IST Genova in Italy. (Figs. 10-15). For the reconstruction of the penis and of the urethra were used three flaps. The corpus of the penis was formed with a pedunculated flap from



Fig. 10: Transsexual F-M.



Fig. 12: The urethra sutured to the corpus of the penis constructed from a reduced m. rectus abdominis.



Fig. 13: The corpus of the penis and the urethra covered with a Chinese flap.



Fig. 11: LAF obtained for the reconstruction of the urethra.



Fig. 14: Schema of the configuration of tissues in the penis and vascular anastomoses.



Fig. 15. Two years after surgery.

the m. rectus abdominis, the urethra was modelled on a LAF catheter and both flaps were covered with a Chinese sensitive flap. The nerves of the flap were sutured to the n. pudendus, which was in this case relatively easily exposed. Vascular anastomoses of both flaps were sutured according to the presented schema (Fig. 14). The blood supply to both flaps provided end-to-end anastomoses between the Chinese flap and the pedicle and vasa epigastrica inferior profunda of the contralateral m. rectus abdominis and the pedicle of the LAF was sutured at the top of the penis to the vasa radialis - the artery end-to-side and the vein end-to-end. The anastomosis of the urethral orifice was not primarily sutured. The healing proceeded without complications. This case belonged into the series of reconstructions of the corpus of the penis with the use of a muscle. However, experience disclosed that a denervated muscle, in this case the m. rectus abdominis, lost about 40%

of its volume and the anticipated fibrotization of muscular fibres failed to yield the expected stiffness of the penis.

CONCLUSIONS

It can be stated that multiple simultaneous microsurgical transfers are used only in a small proportion of cases. In the daily microsurgical routine this is due to larger degree to their indication rather than to technical problems. In our experience survived 100% of the transplanted flaps. The longest duration of the surgical procedure was ten hours and it was performed by a single team, while the shortest duration of an operation was five hours and it was carried out by two teams.

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Address for correspondence: J. Veselý
Berkova 34
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MICROSURGICAL RECONSTRUCTION OF TRAUMATIC DEFECTS ON THE LOWER EXTREMITIES

J. Veselý^{1,2}, V. Procházka², J. Válka¹, J. Kučera¹

¹Department for Plastic and Aesthetic Surgery, Brno

²Institute for Traumatology, Brno

SUMMARY

Out of 167 free transfers 90 were applied to the lower extremities, i.e. 75 for injuries, 11 for an osteomyelitis and 4 for cancer. For these transfers were used the following 15 types of flaps: 37 from the forearm, 15 m. latissimus, 12 m. serratus ant. sup., 6 scapular, 4 fibula, 4 from the groin, 2 gracilis, 2 LAF, 1 TFL, 1 TRAM, 1 dorsalis pedis, 1 sartorius, 1 crista iliaca, 1 rectus abdominis, 1 combined latissimus + serratus. The transfer of flaps was satisfactory in 92%. The transfers to the lower extremity included in no case an emergency flap, in the acute phase within 7 days after injury were transferred 5 flaps. There were in addition 32 delayed and 38 secondary flaps. The report deals with important principles of the application of the above described transfers.

ZUSAMMENFASSUNG

Mikrochirurgische Rekonstruktion traumatischer Defekte an der unteren Extremität

J. Veselý, V. Procházka, J. Válka, J. Kučera

Von insgesamt 167 freien Überpflanzungen wurden 90 an der unteren Extremität durchgeführt, davon waren 75 traumatisch bedingte Defekte, bei 1 bestand eine Osteomyelitis und bei 4 eine Krebserkrankung. Zur Anwendung gelangten 15 Typen von Lappen: 37 Unterarm, 15 M. latissimus, 12 M. serratus, ant. sup., 6 skapulare, 4 inkuinale, 4 Fibula, 2 gracilis, 2 LAF, 1 TFL, 1 TRAM, 1 dorsalis pedis, 1 sartorius, 1 crista iliaca, 1 rectus abdominis, 1 Kombination von latissimus und serratus. Die Lappenübertragung war in 92 % erfolgreich. Auf die unteren Extremitäten wurde in keinem Fall eine Notfalltransplantation vorgenommen, in der akuten Phase (binnen 7 Tage nach dem Unfall) wurden 5 Lappen übertragen. Im Anschluss daran erfolgten 32 verschobene 38 sekundäre Lappenübertragungen. Es werden wichtige Grundsätze der Übertragungen erörtert.

Key words: microsurgery, free flap transfers, lower extremity

The development of surgical reconstruction in the management of traumatic defects of the skin cover, muscle tissues, neurovascular bundles and possibly also of bones resulted in a routine use of microsurgical techniques for the transfer of tissue to the lower extremity. Small defects of soft tissues on the shin and foot can be treated by a rotation of local flaps with a defined vascular pedicle, i.e. either fasciocutaneous or musculocutaneous, however, large defects especially in the presence of infection or when the defect of the bone exceeds 10 cm are treated exclusively by microsurgical transfers. A close cooperation of the microsurgical unit at the Department for Plastic Surgery with the Hospital for Traumatic Surgery in Brno resulted in a routine application of surgical procedures with a minimum of postoperative complications.

Out of 164 studied free microsurgical transfers there were 90 transfers to the lower extremities. In 75 cases because of injuries, in 11 cases for an osteomyelitis after a fracture of the shin bone and in 4 cases for cancer.

The applied 15 types of flaps were harvested from the following sites - forearm (37x), m. latissimus (15x), serratus (12x), scapularis (6x), fibula (4x), a flap from the groin (4x), gracilis (2x), outer arm (2x), tensor fasciae latae (1x), TRAM (1x), dorsalis pedis (1x), sartorius (1x), crista iliaca (1x), rectus abdominis (1x), combined latissimus and serratus (1x). Satisfactory results were attained in 69 transfers, i.e. in 92%.

The youngest patient was aged 4 years and the oldest one 72 years. Only in one case the flap was transferred to the thigh and in another case to the knee region. In all other cases were performed transfers to the defects of the shin and foot.

In 5 cases the flap was used in an acute reconstruction within 7 days after injury, in 32 cases in delayed reconstruction and in 38 cases in a secondary reconstruction. No free flap to the lower extremity was applied within the first 24 hours after injury, as a type of an emergency flap, which was related to a certain degree of the organization of our work and to a certain degree of the



Fig. 1: Posttraumatic scar on the vault and heel with disintegration of skin over the calcaneus.



Fig. 2: Isolated flap from the forearm with a vascular pedicle including the vasa radialis, v. cephalica and two sensitive nerves.



Fig. 3: Two years after surgery.



Fig. 4: Two years after surgery.

devastation of tissues, mostly in the region of the shin, in extensive injuries and if an adequate debridement was not possible.

The technique of our transfers did not differ from the general principles of the microsurgical practice (1). Arterial suture is always carried out end-to-end and we suture only a single vein since the vascular pedicle of the flap is exposed up to the site where concomitant veins unite before joining larger vascular bundles. We do not avoid the use of vascular grafts. The care should be taken that the applied flap is of an adequate size and that it does not prove abundant after the operation. A subsequent modelling is possible only in skin flaps. We warn against a secondary reduction of muscle flaps. This could easily lead to ischemic changes followed by a prolonged healing which occurred in one of our patients.

The larger number of transferred flaps was Chinese flaps (Figs. 1-4) which were used as sensitive flaps for the transfers to the sole of the foot or to the heel, or were used because of their relatively thin profile. As recipient nerves serve on the foot the n. suralis, sensitive branches of the n. tibialis posterior, the sensitive branches of the n. peroneus and n. saphenus. We have a satisfactory experience with the use of sensitive flaps, however, in infected defects on the sole of the foot and especially of the heel we have recently rather used muscle flaps covered with skin grafts. The reason is the resistance of these flaps against pressure. Muscle flaps, represented in particular by m. latissimus (Figs. 5-8) and m. serratus were used to cover extensive defects of the shin, of exposed bones or of open joints.

All these areas were infected and a satisfactory transfer was attained either during a primary necrectomy, or after a delay. A musculocutaneous flap is used only rarely because of its large volume. A relatively large number of flaps included also the skin flaps, as e.g. the flaps from the scapula and from the groin. The scapularis was used because of its easy and quick harvesting and the flap from the groin was used mostly in girls because of little morbidity at the donor site. The linear scar is easily hidden under a bathing costu-

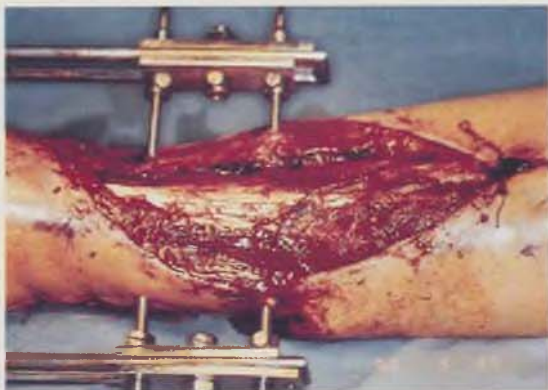


Fig. 5: An open fracture of the tibia with an extensive defect within the distal third part of the shin and an exposure of the bone.



Fig. 6: M. latissimus dorsi after suture to an ATA vascular bundle.

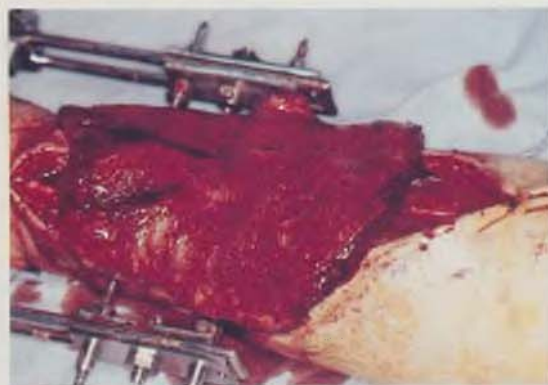


Fig. 7: Three weeks after surgery.



Fig. 8: One and half year after surgery.

me. As far as aesthetic aspects are concerned we would like to draw attention to the use of the muscle flap from the m. rectus abdominis which can be obtained by Pfannenstiel incision and the scar is equally hidden by clothing.

It should be underlined that distant transfers of adequately vascularized tissues, represented in particular by a muscle flap play a very important role in an uncomplicated treatment of extensive defects of the shin with an exposure of bones in fractures of the 3rd degree and in the treatment of posttraumatic osteomyelitis. Routine microsurgical transfers were virtually carried out at all levels of the lower extremity and they completely replaced the use of a cross flap and of tubulated flaps.

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Adress for correspondence:

*J. Veselý
Berkova 34
612 00 Brno
Czech Republic*

SCALP REPLANTATION - A CASE REPORT

Z. Pros, J. Vrtíšková

Department of Plastic and Reconstructive Surgery, 3rd Medical Faculty,
Charles University, Prague, Czech Republic

SUMMARY

A case of succesful scalp replantation is referred. Attention is paid to problems that may accompany this less frequent type of surgery.

ZUSAMENFASSUNG

Replantation des Skalpes - Kasuistischer Beitrag

Z. Pros, J. Vrtíšková

Ein Fall einer erfolgreichen Skalpreplantation wird vorgelegt. Aufmerksamkeit wird Schwierigkeiten gewidmet, die diese seltene Operation begleiten können.

Key words: scalp replantation, microsurgery

Almost thirty years have elapsed since the first finger replantation was carried out in 1965. Replantations on extremities have since become a routine type of treatment in developed countries. Replantation technique was applied in amputation loss of other parts of the body as well. But replantable mutilating injuries elsewhere than on extremities are much less frequent. Up till now only several scalp replantations have been described in the world literature. This type of treatment was recently performed at our clinic, too. Authors present to the reader their experience acquired during the performance and post-operative period of this less usual type of surgery.

CASE REPORT

On June 19, 1994, private farmer V. K. (35), was mending the drive of a running hay collector, when his long hair tied on the top of head was caught by the rotating shaft of the machine. Scalping of the hairy part of his head ensued. Parents drove the patient to the nearest surgical department, but the scalp remained on the spot of the accident near the machine shaft. On request of the surgeon the parents returned for it but it had been exposed for a full hour to noon sunshine.

On the basis of telephone arrangement the patient was transported by air rescue service on our clinic. During the transport the scalp was coo-

led in a thermobox, wrapped in moist sponges and surrounded by ice cubes. At arrival the patient was fully conscious, quiet, his blood pressure was 140/80 Hg mm, puls rate was 90/min. There was practically no bleeding from the wound on the head.

Local finding: The scalp with long hair copied the hair outline, involved the whole of frontal region, including the right eyebrow, the whole of frontal muscle and the better part of the occipital muscle, galea aponeurotica and a wide stripe of periosteum. The right part of occipital region showed stronger laceration of the scalp and several skin flaps were torn off in full thickness to the level of hair follicles. The scalped head showed deperiosted calva and no bleeding of the margin of the wound with an apparent pulsation of thrombosed arteries was present. In the right temporal region, a lacerated flap of 4 x 6 cm was torn off, attached with a 4 cm wide stripe in front of the right ear. The dermal parts of the outer meatus accusticus were circularly torn off on both sides of the head.

Treatment sequence: In the out-patient operating room the scalp was shaven, cleaned from all impurities, disinfected and wrapped into sterile damp diapers. While the patient was being prepared at the intensive care unit, we searched under operating microscope for vessels suitable for anastomoses. This was successful with arteries, but the empty veins could not be identified. Later on it became apparent that they have been

situated differently than the arteries and that their walls have been very thin. Then the patient was placed on the operating table in supine position, remaining hair and beard in the temporal and occipital region were shaved, general anaesthesia was induced, coagulation of some bleeding of diploic veins was performed and the scalp was placed and fixed by a few adaptation stitches on the periphery. As no veins had been found beforehand on the scalp, we started by anastomoses of a. temporalis superficialis on the left. When the vessels clamps were removed, perfusion of almost the whole scalp was resumed. Bleeding from bigger veins was temporarily stopped by clamps. Restoration of blood perfusion made the position of the veins visible and anastomoses of v. temporalis superficialis and v. retroauricularis on the left side were performed. We turned carefully the head and performed successively the anastomoses of the right v. and a. supraorbitalis, frontal branch of the right a. and v. temporalis superficialis and of the right a. and v. occipitalis. On the whole, nine vessels anastomoses were performed - four arterial and five venal ones. The scalp perfusion was restored eight hours after the injury. The surgery lasted nine hours forty five minutes and was performed in the protective coagulum of 300 mg Klindamycin and 80 mg Gentamicin. Blood loss was restituted by blood transfusion. The operation was concluded by the introduction of three Redon drains placed under galea, the suture of the skin of meatus acusticus bilaterally, the skin sutures on the periphery of the scalp and by placing a light compressive bandage.

Post-operative course: No fundamental complications in the post-operative period were noted, neither suppuration or any noticeable oedema. We feared the current replantation measure of anicoagulant therapy because of a danger of pronounced bleeding under galea. The reports in literature vary, some authors apply nothing, others only platelets inhibitors, others again classic anticoagulant therapy. Finally we decided for a Fraxiparine dosis of 7500 u.i. per day combined with Anopyrine 3x 1/2 tabl. We continued Fraxiparine for twelve days. Anopyrine for three weeks. No fluctuation under the scalp was noticed. Drains were gradually removed from the fifth to the seventh day, antibiotics were stopped on the fifth and the tenth day. Stitches were removed two weeks after the accident. In the third week superficial necroses in the right occipital region, the place of the most severe laceration of the scalp, and torn flaps of skin were removed as well as in the right temporal region. Defects were covered by xeno skin grafts later on replaced by splitness skin grafts. Hair on the replanted scalp did not fall off, in contrast its growth could be noticed every week. Temporarily, only a part of the right brow fell off, but in a month, its growth has caught up. Three months after the accident, the patient's hair has grown to 5 cm, he has continued his work at the farm and has had no compla-

ints concerning the loss of sensitivity of the scalped part of the head.

CONCLUSIONS

The authors would like to point out some differences of scalp replantation in contrast to extremities replantation. A good perfusion in almost the whole scalp appeared after the first arterial anastomosis. To make sure, several further vessel



Fig. 1: Scalp on admission with visible major part of the forehead and the right eyebrow.

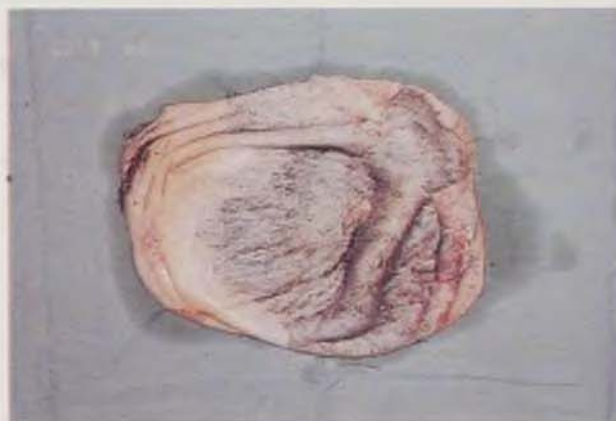


Fig. 2: Scalp after shaving from the outer side.



Fig. 3: Scalp after shaving from the inner side.



Fig. 4: Fourteen days after the accident, before stiches were removed.



Fig. 5: Fourteen days after the accident, apparent demarcating necroses on the right temple.



Fig. 6: Fourteen days after the accident, the less lacerated left side.



Fig. 7: Fourteen days after the accident, demarcating necroses in the occipital region.



Fig. 8: Four weeks after the accident, frontal view.



Fig. 9: Four weeks after the accident, defects after necrectomy covered by xeno skin grafts.



Fig. 10: Four weeks after the accident, left view.



Fig. 11: Four weeks after the accident, defects covered by xeno skin grafts.



Fig. 12: Three months after the accident, frontal view.



Fig. 13: Three months after the accident, right side view.



Fig. 14: Three months after the accident, left side view.



Fig. 15: Three months after the accident, view from behind.

anastomoses were performed, but apparently they were not crucial for the survival of the replanted scalp. It may be expected, that in case that there are no other suitable vessels at hand, that the scalp perfusion can be provided by one arterial and one venal anastomoses placed contralaterally. Preparation and anastomosing of arteries present no difficulties at this locality, but the veins have very thin walls and anastomosing is rather difficult. Veins could be found only when they were filled, that means after the clamps on arterial anastomoses were removed. This procedure, indispensable in this case, brings about a considerable loss of blood. In amputations of extremities, that were torn off, maximally a 20% success of replantations is expected. In the scalp, that was also torn off, no thromboses in anastomoses appeared in the post-operative course, in contrast, good passage of all anastomosed arteries was in

course of the treatment repeatedly checked by the Doppler apparatus. Authors were surprised by a very small swelling, possibly brought about by the elimination of blood retention under galea by a plenty of drainage.

Where replantation is not possible, the covering of the defect after a complete head scalping is very difficult. It is particularly difficult in the case where a loss of the periosteum of calva occurred. This condition requires a longterm stressing treatment and its functional and aesthetic result is not satisfactory. Because of this, the surgery lasting several hours in scalp replantation, is of great importance for the patient and for the staff as well. The patient can return rather early to his normal life, without any consequences that are usually entailed by the current treatment after the scalping of the head.

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Address for correspondence:

Z. Pros
Srobárova 50
100 34 Praha 10
Czech Republic

GOLDENHAR'S SYNDROME - A CASE REPORT

A. Singh, G. Malhotra, G. P. Singh, K. J. S. Mander, S. K. Gulati

Department of Plastic and Reconstructive Surgery, Government Medical College,
Rajendra Hospital, Patiala, Punjab, India

SUMMARY

A case of Goldenhar's syndrome in a three months old male child with epibulbar dermoid (Fig. 1), accessory auricular appendages (Fig. 2), transverse facial cleft (Figs. 1 and 3), pedunculated mass on the left cheek (Figs. 2 and 3), asymmetry of skull (Fig. 4) and imperforate anus (already operated) is presented. Literature is reviewed briefly and aetiopathogenesis discussed in short.

ZUSAMMENFASSUNG

Goldenhar Syndrom - Kasuistischer Beitrag

A. Singh, G. Malhotra, G. P. Singh, K. J. S. Mander, S. K. Gulati

Ein Goldenhar Syndrom bei einem 3 Monate alten männlichem Säugling mit einem epibulbaren Dermoid (Abb. 1), zusätzlichen aurikulären Appendixen (Abb. 2), einer transversalen Gesichtsspalte (Abb. 1 und 3), einem gestielten Gebilde an der linken Wange (Abb. 2 und 3), einer Schädelassymmetrie (Abb. 4), und mit einem nicht perforierten anus (bereits geöffnet) wird beschrieben. Eine kurze Erörterung der Aetiopathogenese mit einer Übersicht der Literatur.

Key words: Goldenhar's syndrome

Goldenhar's syndrome is a rare congenital anomaly. It is a variant of the first and second branchial arch syndrome and is specially characterised by epibulbar dermoid/lipodermoid, auricular appendages and/or preauricular fistulae. In some cases vertebral anomalies are also present. Other congenital anomalies are not uncommon.

Oculo-auricular dystrophy was first described by Von Arlt in 1845 as quoted by Reddy and Rao (1987) and it was named after publication by Goldenhar in 1952. Later on in 1963 due to finding of occasional association of vertebral anomalies Gorlin et al. named it Oculo-auricular-vertebral dysplasia.

CASE REPORT

A three months old male child, born at full term by normal vaginal delivery, was admitted for treatment of multiple left facial inborn malformations. There was nothing relevant in the family history and antenatal history. Imperforate anus had already been operated at birth.

Clinical findings:

1. Lower temporal epibulbar dermoid of left eye (Fig. 1).

2. Three auricular appendages in the preauricular region (Fig. 2).

3. Transverse facial cleft on the left side (Fig. 1 and 3).

4. Pedunculated cartilagenous mass on the left cheek near the end of the transverse cleft (Fig. 2 and 3).

5. Asymmetry of skull (Fig. 4).

6. Imperforate anus - already operated.



Fig. 1: Photograph showing epibulbar dermoid and transverse facial cleft on the left side.



Fig. 2: Photograph showing preauricular appendages, transverse facial cleft and pedunculated mass on the left cheek.



Fig. 3: Photograph showing transverse cleft and pedunculated mass on the left cheek.



Fig. 4: Photograph showing asymmetry of skull.

TREATMENT

The transverse facial cleft was repaired in layers by Z-plasty. The pedunculated mass on the left cheek was excised and the defect was closed in layers. The result is shown in Fig. 5.



Fig. 5: Post-operative photograph showing repaired transverse facial cleft and excision of pedunculated mass on the left cheek.

DISCUSSION

The syndrome is a variant of the first and the second branchial arch syndrome. Chromosomal studies did not reveal any abnormality and there was no evidence of it being a hereditary disorder (Reddy and Rao, 1987). Mandibulofacial malformation appears to be due to failure of the embryonic blood supply during a critical period in the development of the face i.e. from 3rd to 5th week (Mckenzie, 1958). Epibulbar dermoids present in the lower temporal quadrant are due to an abnormal differentiation of pluripotent embryonic cells located between edges of the optic cup and the ectoderm (Mann, 1957).

Contrary to the observations of Gorlin et al. (1963) and similar to observations of Reddy and Rao (1987) and Mehdiratta et al. (1988), no vertebral anomaly was seen in the present case. Hypoplasia of bony skeleton on the affected side of the face which was observed by Reddy and Rao (1987), was absent in our case.

Transverse facial cleft present in this case has also been reported by Reddy and Rao (1987) in four out of six cases. Asymmetry of skull has been described in the literature as well.

Association of imperforate anus present in our case has not been reported earlier. Another interesting accompanying anomaly is a pedunculated cartilaginous mass attached to the left cheek lateral to the transverse cleft.

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Address for correspondence: **Avtar Singh**
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MATERNAL HYPERTHERMIA AND INFECTION AS ONE OF POSSIBLE CAUSES OF OROFACIAL CLEFTS

M. Peterka¹, M. Tvrdek², Z. Likovský¹, R. Peterková¹, M. Fára²

¹ Institute of Experimental Medicine, Laboratory of Teratology, Academy of Sciences of the Czech Republic, Prague, Czech Republic

² Clinic of Plastic Surgery, University Hospital Královské Vinohrady, Prague, Czech Republic

SUMMARY

It has been proposed that the hyperthermia in pregnant women may be associated with birth defects in their offsprings. We analysed the retrospective interview data on probable febrile illness during critical period of orofacial clefts development in 992 mothers of boys and girls with three types of orofacial clefts - cleft lip, unilateral or bilateral cleft lip and palate and cleft palate. A number of mother that gave the positive answer was relatively high and varied from 24% to 33%. There were no significant differences of the incidence of mother febrile illness between three groups of orofacial clefts in boys and girls. These data support presumption on the harmful effect of febrile illness during early pregnancy on craniofacial development.

ZUSSAMMENFASSUNG

Mütterliche Hyperthermie und Infektion als eine der möglichen Ursachen der orofazialen Spaltmissbildungen

M. Peterka, M. Tvrdek, Z. Likovský, R. Peterková, M. Fára

Es wurde die Ansicht geäußert, dass bei schwangeren Frauen eine Hyperthermie die Entstehung von angeborenen Missbildungen bei ihren Kindern bedingen könnte. Es erfolgte eine retrospektive Analyse der Angaben über eine mögliche febrile Episode in der kritischen Periode für die Entstehung der orofazialen Spaltmissbildungen bei Besprechungen mit 992 Müttern von Jungen und Mädchen mit 3 Typen der orofazialen Spaltmissbildungen - Lippenpalte, inilaterale bzw. bilaterale Lippen- und Gaumenspalte, und Gaumenspalte. Eine positive Antwort wurde bei einer relativ hohen Anzahl der Mütter verzeichnet, sie schwankte zwischen 24% und 33%. Es bestanden keine signifikanten Unterschiede in der Häufigkeit der fieberhaften Erkrankung der Mutter zwischen den 3 Typen der orofazialen Spaltmissbildungen bei Jungen und Mädchen. Diese Angaben unterstützen die Ansichten über die schädliche Einwirkung einer fieberhaften Erkrankung während der frühen Schwangerschaft auf die orofaziale Entwicklung.

Key words: maternal hyperthermia, orofacial cleft, febrile illness

Causes of inborn defects in man are generally divided into genetic and epigenetic. The exclusively genetic factors are supposed to induce about 20%, the exposition to a single severe exogenous factor has been proved in 10% of cases. In the remaining 70%, no single strong factor of either genetic or epigenetic nature can be demonstrated. Therefore, the majority of inborn defects is supposed to arise under the influence of several mild factors effecting as the factor complex (Peterka, 1985; Warkany, 1986).

A single exogenous factor needs to act in the over-threshold dose to induce a developmental defect. The level of the effectivity threshold of each factor depends also on the genetically determined predisposition of the affected individuum (Fig. 1). Either a single strong exogenous factor or factor

complex are able to overcome the threshold and induce a developmental disturbance. A typical example of prenatal exposition to the factor complex is the maternal acute respiratory infection (common cold, angina, influenza) accompanied by fever and/or medication (antipyretics, antibiotics) during pregnancy (Warkany, 1986). It has been reported, that the febrile influenza may be associated with an increased risk of origin of congenital defects, especially of the central nervous system (Layde et al., 1980).

The only maternal hyperthermia of even short duration induces dramatic teratogenic effects in all experimental animal studies (Edwards, 1986; Upfold and Smith, 1988). In human, several case have been published and the association reported between the maternal hyperthermia

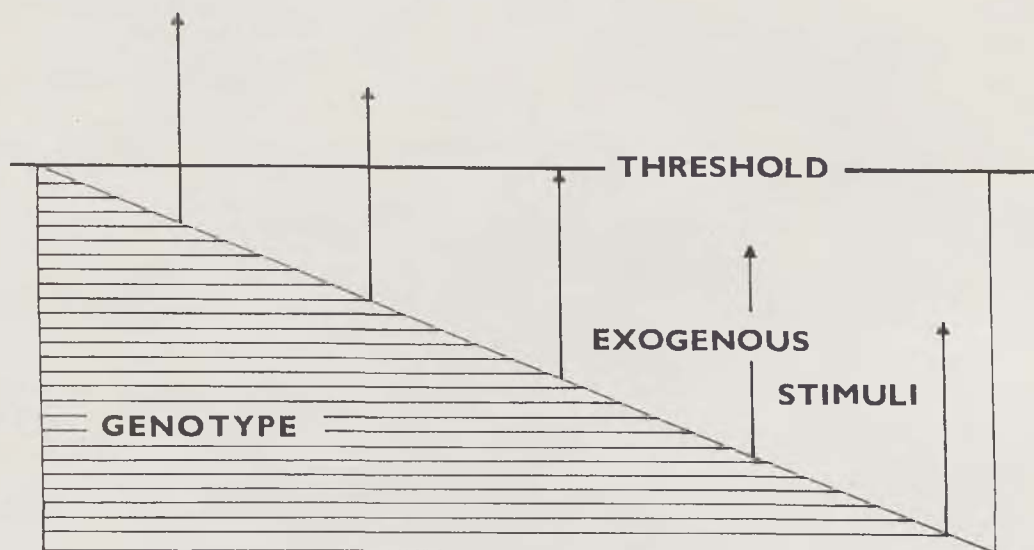


Fig. 1: Schematic explanation of the prenatal resistance and receptivity of individuals to an exogenous stimulus effect in dependence on their genetic predisposition.

The threshold of embryotoxicity manifestation after the prenatal exposition to the same stimulus is overcome in individuals with higher genetic predisposition resulting in developmental defect and/or death of the embryo (fetus).

during pregnancy and mental retardation, brain and nerve abnormalities, microphthalmia and facial deformities in offsprings (Shiota, 1982; Layde et al., 1980).

The aim of the present retrospective study was to determine and compare the incidence of acute infection diseases with fever in mothers of boys and girls with three types of orofacial clefts. We focused to the anamnesis data on the second month of pregnancy, which represents the critical period of orofacial clefts development.

MATERIAL AND METHOD

Nearly all children with orofacial clefts born in Bohemia country are treated at the Clinic of Plastic Surgery in Prague. Therefore, the standard registration of children with orofacial clefts is relatively high. In our study we examined all mothers of the registered children with orofacial clefts born between 1984 - 1990. The retrospective data were obtained from questionnaires filled in by mothers of 922 affected children (Tab. 1) in course of the entrance examination. Most interviews were conducted within four month after the birth of a child with orofacial cleft (Fig. 2). The data on the acute infection with fever (37.5 - 39.0°C) during early pregnancy were immediately complemented and specified by physician during the examination itself: the questions were focused to the relevant critical period of orofacial clefts origin - approximately within 25 and 60 days of pregnancy. Boys and girls with orofacial clefts we-

re divided according to their diagnosis into three groups: cleft lip, cleft palate and unilateral or bilateral cleft lip and palate (Tab. 1).

No group of children without orofacial cleft was used as a control in the present study. The patients with orofacial clefts came from all over Bohemia. The corresponding control group of mothers and children should have the same distribution of living locality, age, profession and social class, and the retrospective data on pregnancies should be collected at about the same time. The constitution of such a set appeared to be practically impossible. Therefore, the proportions of mothers with positive anamnesis data were compared between various types of orofacial clefts in boys and girls and tested by X^2 test.

Table 1: Numbers of probands with cleft lip (CL), cleft lip and palate (CLP) and cleft palate (CP) born in Bohemia during years 1984 - 1990.

Year	Boys			Girls		
	CL	CLP	CP	CL	CLP	CP
1984	31	40	18	12	16	34
1985	24	40	29	21	26	25
1986	25	28	23	17	16	27
1987	28	27	17	10	11	27
1988	19	50	15	16	11	25
1989	19	32	14	13	18	20
1990	16	24	11	12	17	18
Total	162	241	127	101	115	176

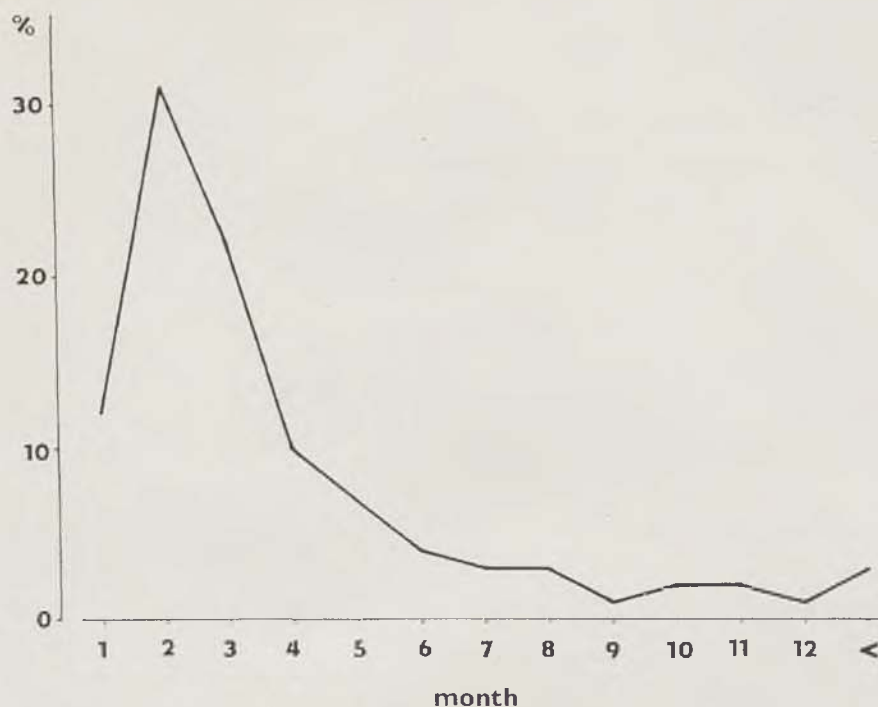


Fig. 2: Age distribution of children with orofacial clefts in time of their first examination at the Clinic of Plastic Surgery, Prague. Abscissa: age in month. Ordinate: percent children.

RESULTS

The cleft lip group

The acute infection and fever was found in 52 cases (32%) and in 32 cases (32%) from 162 mothers of boys and 101 mothers of girls with cleft lip, respectively. The incidence of mothers with positive anamnesis did not differ between boys and girls (Fig. 3).

The cleft lip or palate group

In 241 mothers which born a boy with total unilateral or bilateral cleft, 63 mothers (26%) had the positive anamnesis. In 115 mothers of girls with the same cleft type, 38 woman (33%) introduced the febrile illness during the second month of pregnancy. No statistically significant difference was found between mothers of boys and girls (Fig. 4).

CHILDREN WITH CL

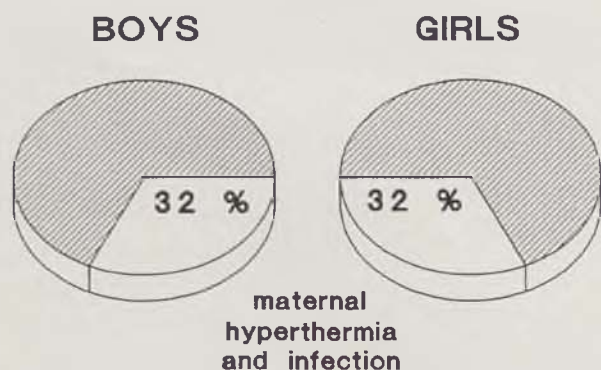


Fig. 3: Percentage of maternal febrile illness during the critical period of the prenatal development in children with cleft lip (CL).

CHILDREN WITH CLP

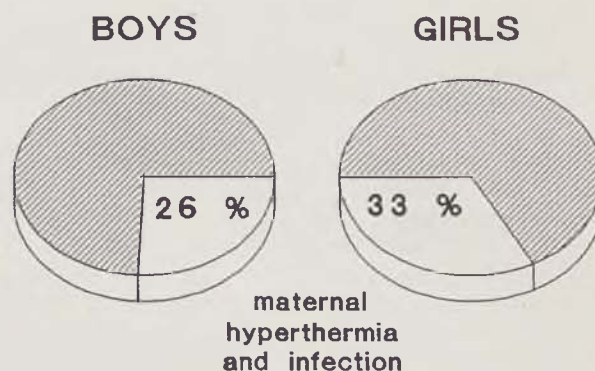


Fig. 4: Percentage of maternal febrile illness during the critical period of the prenatal development in children with cleft lip and palate (CLP).

The cleft palate group

The positive anamnesis data were found in 33 (26%) and 43 (24%) cases from 127 mothers of boys and 176 mothers of girls with cleft palate, respectively. No statistically significant difference was found between both groups (Fig. 5).

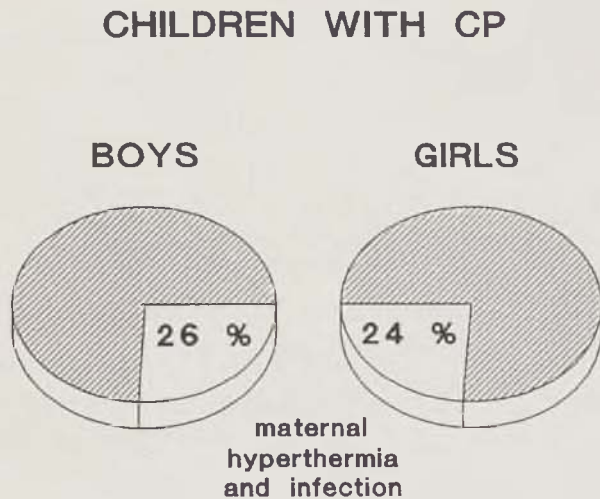


Fig. 5: Percentage of maternal febrile illness during the critical period of the prenatal development in children with cleft palate (CP).

DISCUSSION

Totally, in 24% - 33% mothers of probands with orofacial clefts, the positive anamnestic data were found on an acute infection with fever during the second month of pregnancy. The percentage of mothers with the positive anamnesis did not significantly differ between girls and boys and between three types of orofacial clefts. Our epidemiological data support the presumption that higher maternal body temperature associated with a febrile illness during pregnancy might produce developmental defects.

Edwards (1986) concludes in his review article that a body temperature threshold exists in homeothermic animals including man and elevation of temperature by 1.5 - 2.5°C is known to cause embryonic resorptions, abortions and malformations. In experimental animals, the hyperthermia induces exencephaly, microphthalmia, hypoplasia of teeth, maxillary hypoplasia and facial clefting, cataract, renal agenesis, and heart and vascular defects etc. (e.g. Edwards, 1986; Shepard, 1986).

Several literary data refer the negative (embryotoxic, teratogenic) effect of the maternal hyperthermia on prenatal development of a child provided it acts either solely (as a result of higher temperature of maternal environment) or in combination with infectious illness of mother.

Conditions in the traditional Finnish sauna provide an ideal possibility to study the effect of hyperthermia on the developing embryo in the absence of confounding factors. Saxén et al. (1982) have performed the retrospective study focused to a possible causal relationship between the sauna heat exposure and congenital defects. The Finnish women may be exposed to a temperature of 70°C to 90°C once a week for 20 minutes during her pregnancy. During exposure to the sauna heat, the rectal temperature is restored within 1 - 2 hours. The authors conclude that the relatively mild temporary hyperthermia induced by sauna should not be considered as a risk for developing embryo.

In the prospective study of more than 23 000 pregnancies (Milunsky et al., 1992), a heat exposure induced by sauna, hot tube, fever and electric blankets has been documented in 5 556 cases. Forty nine women in the group of mothers with various types of the prenatal hot exposure had a child with a neural tube defect. The authors conclude the hot tube presents the greatest risk for origin of neural tube defects, whilst the heat exposure induced by sauna or fever exhibit a lesser risk. The electric blanket was not significant factor for origin of neural tube defects (Milunsky et al., 1992).

Lipson (1988) reported the significant association between the maternal hyperthermia in course of the first trimester of pregnancy and congenital intestinal agangliosis - Hirschsprung disease.

Layde et al. (1980) have proposed that hyperthermia in the pregnant women is associated with origin of neural tube defects in the offsprings. They analysed the retrospective interview data on the maternal history and searched for a febrile illness during the first trimester of pregnancy among mothers of newborns with anencephaly or spina bifida, orofacial clefts and Down syndrome.

The incidence of febrile illness in mothers of children with neural tube defects was 16% and in mothers of children with orofacial clefts was 13%. This difference, however, was not significant. Incidence of febrile illness in neural tube defect group was significantly higher in comparison with incidence of hyperthermia among mothers of children with Down syndrome (8%) (Layde et al., 1980).

In the present study, we got positive answers on febrile illness in 24% - 33% of mothers of children with orofacial clefts, which is twice to nearly three times higher than in the above mentioned study (Layde et al., 1980).

At the end, several words by Warkany (1986) can be introduced: "...many reports on hyperthermia of women with malformed children have been published. Yet proof of causal connection has not been possible." In principle, epidemiologic data are not able to prove or reject a causal relationship between maternal hyperthermia and developmental defect in offspring. Our epidemiologic

study documenting the relatively high incidence of febrile illness during early pregnancy in mothers of children with orofacial clefts brings further data supporting presumption that hyperthermia associated with maternal illness should

be considered as a risk factor during prenatal development in man.

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Address for correspondence: M. Peterka
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GROWTH OF THE DENTAL ARCH IN PATIENTS WITH COMPLETE UNILATERAL CLEFT LIP AND PALATE AFTER PRIMARY PERIOSTEOPLASTY

M. Tomanová¹, Ž. Müllerová²

¹Laboratory of Craniofacial Malformations, Institute of Experimental Medicine, Academy of Sciences of the Czech Republic, Prague

²Department for Cleft Malformations, University Hospital Královské Vinohrady, Prague, Czech Republic

SUMMARY

On dental casts obtained in 28 patients with unilateral cleft lip and palate treated with primary periosteal flap surgery were investigated the length and width parameters of the dentoalveolar arch of the upper and lower jaws. The patients were examined prior to palate surgery and subsequently in adulthood.

The series of controls includes individuals without clefts matched in age. Prior to palate surgery the width of the maxillary dentoalveolar arch in clefts was smaller when it was measured as the distance between the canines, while it was larger between deciduous second molars. The length of the maxilla was shortened. Parameters of the width of the anterior and middle segment of the maxilla remained unchanged in clefts up to adulthood and therefore were significantly smaller in adults with clefts as compared to controls. The length of the maxilla increased up to adulthood though less than in controls.

Both in childhood and in adulthood the dimensions of the mandibular alveolar arch were identical with the situation in controls.

ZUSAMMENFASSUNG

Wachstum des Zahnbogens bei Patienten mit totalen einseitigen Lippen und Gaumenspalten nach einem periostealen Lappen

M. Tomanová, Ž. Müllerová

An Zahnmodellen von 28 Patienten mit einseitigen totalen Lippen und Gaumenspalten und einem periostealen Lappen erfolgten Messungen der Breite und Länge des dentoalveolaren Bogens am Ober-, und Unterkiefer. Die Untersuchungen wurden vor der Gaumenoperation und später bei erwachsenen Patienten durchgeführt.

Die Kontrollgruppe bestand aus Probanden desselben Alters ohne Spaltmissbildungen. Die Breite des dentoalveolaren Bogens des Oberkiefers war bei Spaltmissbildungen vor der Gaumenoperation kleiner zwischen den Kaninen und im Gegenteil grösser zwischen den zweiten Promolaren des Milchgebisses. Die Länge des Oberkiefers war verkürzt.

Die Parameter der Breite des vorderen und mittleren Segmentes des Oberkiefers wiesen bei Spaltmissbildungen bis zum Erwachsenenalter keine Änderungen auf, und waren daher bei Erwachsenen mit Spaltmissbildungen signifikant kleiner als bei der Kontrollen. Die Länge des Oberkiefers vergrösserte sich bis zum Erwachsenenalter, jedoch weniger als bei den Kontrollen.

Die Dimensionen des dentoalveolaren Bogens des Unterkiefers waren sowohl bei Kinder, wie auch bei Erwachsenen völlig identisch mit der Situation bei den Kontrollpersonen.

Key words: unilateral cleft lip and palate, dental arch, growth

The most severely affected structure in cleft lip and palate represents the maxilla with a characteristic growth deficiency. The deficient growth is the sequel of the presence of a cleft (embryonal disorder of the morphogenetic function of maxillary processes, an impaired development due to the altered interrelations of present structures a.o.),

however, it is mainly due to the therapeutic interest focused to the affected area.

A hypoplastic maxilla is associated with aesthetic and functional alterations which are troublesome for the patient. Clefts are accompanied by a series of orthodontic anomalies.

The present study is aimed at an assessment of the growth of the dentoalveolar arch of the upper and lower jaw in patients with complete unilateral cleft lip and palate treated by a bridging of the cleft alveolar process with a periosteal flap. The purpose of this study was to ascertain the extent of impairment of the size upper and lower dentoalveolar arch, if any, in patients with these clefts prior to palatal surgery (after the repair of the lip and periosteal flap surgery), as well as condition in adulthood.

MATERIAL AND METHOD

The studied series included 28 males with complete unilateral cleft lip and palate without any visible associated anomalies. The lip was repaired according to Tennison at the age of about 8 months. Simultaneously with lip repair the alveolar cleft was bridged with a periosteal flap. Palatal

repair was carried out at the age of about 5 years with a pushback and pharyngeal flap surgery. All patients were operated at the Department for Plastic Surgery in Prague in the late seventies and early eighties. The patients were examined prior to palate surgery at a mean age of 4 years 8 months and subsequently in adulthood at a mean age of 17 years 6 months. The series of controls consisted of individuals without clefts and included 19 boys (mean age 4 years 11 months) and 30 adults (mean age 20 years 4 months).

Our study is based on measurements of dental casts of the upper and lower jaw. These measurements illustrate changes in the width and length dimensions of the alveolar arch. The width dimensions were measured at the lower margin of the crown both in deciduous and permanent dentition at the inner side of the dental arch perpendicular to the medial plane. In patients with clefts were measured segments which were not affected by clefts.

Table 1. Mean values and standard errors of dental arch dimensions in UCLPc patients and controls.

	5 Years				Adults			
	UCLPc (n=22)		Control (n=19)		UCLPc (n=28)		Control (n=30)	
	\bar{X}	SE	\bar{X}	SE	\bar{X}	SE	\bar{X}	SE
Maxillary widths								
W3	22.95	0.51	24.33	0.40	23.68	0.82	25.60	0.26
W4	27.37	0.56	27.34	0.41	26.06	0.78	29.03	0.34
W5	31.79	0.59	30.24	0.39	30.68	0.79	34.03	0.35
WT	39.74	0.51	38.64	0.49	44.44	0.91	45.68	0.55
Maxillary lengths								
P-T	30.13	0.54	32.41	0.38	40.29	0.60	46.14	0.86
P-5	23.08	0.40	23.55	0.28	19.85	0.49	20.50	0.32
Mandibular widths								
W3	18.75	0.37	18.93	0.27	20.34	0.26	19.90	0.30
W4	23.81	0.34	24.64	0.38	26.76	0.40	27.07	0.37
W5	28.45	0.37	29.03	0.39	30.36	0.47	31.28	0.46
Mandibular length								
P5	20.83	0.33	21.55	0.29	16.34	0.52	16.58	0.38

Table 2. Comparison between groups (t-test).

	UCLPc x Con (5 Years) dif.	UCLPc x Con (Adult) dif.	5 Yrs x Ad (UCLPc) dif.	5 Yrs x Ad (Control) dif.
Maxillary widths				
W3	-1.38*	-1.92*	+0.6	+1.27**
W4	+0.04	-2.97***	-1.51	+1.69**
W5	+1.55*	-3.35***	-0.65	+3.79***
WT	+1.09	-1.25	+4.15***	+7.04***
Maxillary lengths				
P-T	-2.28**	-5.85***	+10.51***	+13.73***
P-5	-0.47	-0.65	-2.80***	-3.05***
Mandibular widths				
W3	-0.18	+0.44	+1.77***	+0.97*
W4	-0.83	-0.31	+3.02***	+2.43***
W5	-0.58	-0.92	+1.73**	+2.25***
Mandibular length				
P-5	-0.72	-0.24	-4.36***	-4.97***

Significant differences at $p < 0.001^{***}$, $p < 0.01^{**}$, $p < 0.05^{*}$

Determined were the distances between canines (W3), between deciduous first molars or first premolars (W4), between deciduous second molars or second premolars (W5) and on the maxilla between the tubera (WT). The reference point on the tubera was constructed at the site where the ridge of the alveolar arch merged with the most posterior point of the maxillary tuber. The length of the alveolar arch was measured from the mid-point of the papilla incisiva (P). Measured was the distance between P and connecting line of the posterior side of the deciduous second molars or the second premolars of the permanent dentition (P-5). The dimension P-T on the maxilla designates the length of the dentoalveolar arch beyond the maxillary tubera.

All dimensions were measured with a sliding caliper with a precision of some tenths of a millimeter.

The significance of differences between the series was assessed with the t-test, the significance of differences between both age groups was evaluated in 22 individuals with clefts with the paired t-test.

RESULTS

a) Growth of the width of maxillary dentoalveolar arch.

The width of the maxillary dental arch in the region of canines (W3) was smaller than in controls both prior to palate surgery and in adulthood. A transverse growth between canines was recorded in the series of controls from the age of 5 years up to adulthood. In patients with clefts the dimension W3 remained unchanged from childhood up to adulthood. The width of the dental arch between the first molars of the deciduous dentition (W4) was identical in clefts prior to surgery with that recorded in controls matched in age. The width between second deciduous molars (W5) was somewhat larger in clefts than in controls.

Both dimensions (W4, W5) increase in the series of controls but remain unchanged in clefts. In adulthood the width of the dental arch in the region of the first and second premolars is markedly smaller in patients with clefts.

The distance between the tubera (WT) prior to palate surgery was identical in patients with clefts and in controls. The dimension WT increased from childhood up to adulthood both in patients with clefts and in controls. In adults the distance between the tubera was identical in both series.

b) Growth of the length of the maxillary dentoalveolar arch.

The dimension P-5 characterizing the sagittal growth of the anterior and the middle segment of the maxilla was identical in clefts prior to surgery and in controls. This dimension is in both series smaller in adults and it attains the same values in clefts and in controls.

The length of the maxillary dentoalveolar arch (P-T) is smaller in patients with clefts both preoperatively and in adulthood than in controls. The maxilla grows in sagittal direction in both series, yet it shows smaller increments in clefts.

c) Growth of the mandibular dentoalveolar arch.

No parameters of the width of the mandibular dentoalveolar arch (W3, W4, W5) differ prior to surgery or in adulthood from the size of these di-

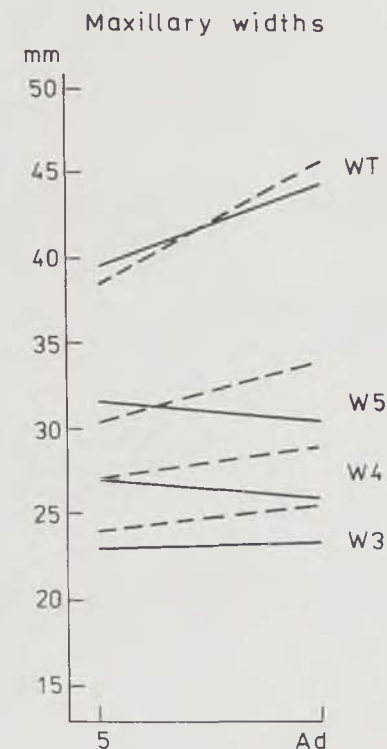


Fig. 1: Maxillary arch widths (see text) in patients with unilateral cleft lip and palate (full line) as compared to controls (dashed line).

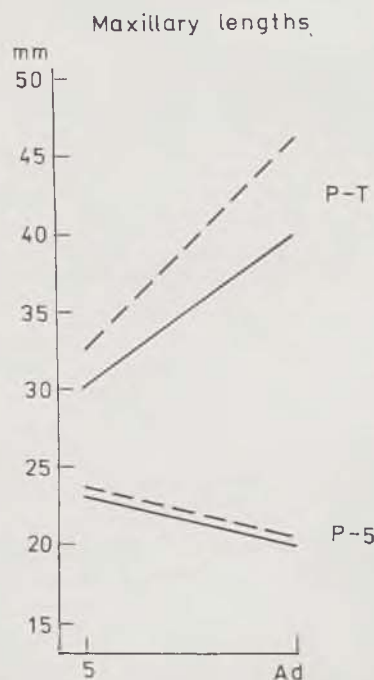


Fig. 2: Maxillary arch lengths (see text) in patients with unilateral cleft lip and palate (full line) as compared to controls (dashed line).

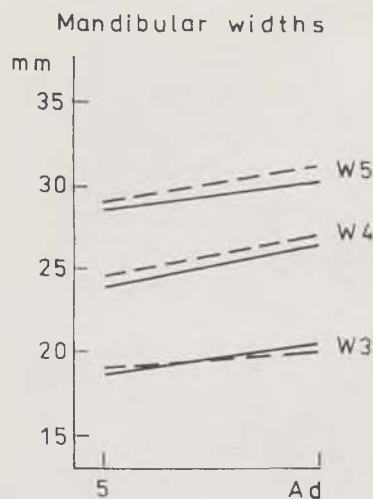


Fig. 3: Mandibular arch widths (see text) in patients with unilateral cleft lip and palate (full line) as compared to controls (dashed line).

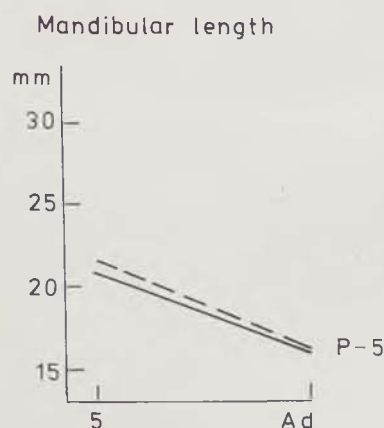


Fig. 4: Mandibular arch length (see text) in patients with unilateral cleft lip and palate (full line) as compared to controls (dashed line).

mensions in matched controls. Both in clefts and in controls all dimensions of mandibular width increase from childhood up to adulthood. The length of the mandible behind the second molars (P-5) is identical in clefts prior to surgery and in adulthood with that recorded in controls. This dimension is smaller in clefts and in controls during adult age than in the period of deciduous teeth.

DISCUSSION

Our results disclosed that while the width and length of the dentoalveolar arch of the upper jaw undergo changes in unilateral cleft lip and palate, the dentoalveolar arch of the lower jaw remains within the range of the norm. Prior to palate surgery the maxillary dentoalveolar arch of patients with complete unilateral cleft lip and palate is narrower in the region of canines (W3) and its length is shorter (P-T) as compared to controls without clefts. In the region of deciduous second molars (W5) it is on the contrary wider.

A narrower dental arch in the region of canines is most probably the sequel of the suture of the lip. A reduction of the distance between cani-

nes after cheiloplasty in patients with unilateral cleft lip and palate described Wada et al. (1984). A wider dental arch in the region of the second molars was wider in patients with clefts prior to palatoplasty because of the presence of a cleft which separates the disconnected segments of the maxilla (Peterka, 1984).

The length of the dental arch was measured behind the second molars both in the upper and lower jaw (P-5) was conceivably shorter both in clefts and in controls, than when it was measured in the period of deciduous dentition (which is due to the replacement of wider deciduous molars by narrower premolars).

The shortening of maxillary length in clefts which is present already prior to palate surgery is suggestive of a primary impairment of the sagittal growth of the maxilla. However, it is believed that palatoplasty represents the most important factor contributing to the deficient anteroposterior growth of the maxilla. Keller et al. (1988) assessed the effect of pharyngeal flap surgery (performed at the age of 5 to 7 years) on the dimensions of the maxillary dental arch and they disclosed a negative effect of this surgical procedure on the length, as well as on the width of the dental arch. Our observations of smaller increments of maxillary length recorded from childhood up to adulthood in clefts, as compared to controls was in agreement with the above mentioned conclusions.

Our results showed that in clefts the width of the maxilla in the region of canines, first and second deciduous molars does not increase in the period from childhood to adulthood. Therefore in adults with clefts the width of the dental arch is smaller in these regions than in controls. However, it would be obviously incorrect to state that transverse growth is missing in these regions. It should be realised that our data solely illustrate the situation prior to palate surgery and subsequently in adults. Thus we did not ascertain changes in the width of the dental arch related to the closure of the palate leading to a reduction of this dimension (Jelinek et al., 1983). A narrower anterior and middle segment of the maxilla in unilateral clefts after surgical closure of the palate is a regularly observed feature (Athanasίου et al., 1988).

However it is present equally in individuals without surgical repair and is due to the medial rotation of the cleft segment of the maxilla (da Silva Filho, 1992). Thus it is difficult to reach the conclusion to what extent the configuration of the anterior and middle segment of the maxilla in our patients with clefts represents the sequelae of palatoplasty and to what extent it is due to the medial collapse of maxillary segments. If the latter case would be true it would provide evidence that the use of periosteal flap surgery cannot prevent a collapse of maxillary segments. It will be necessary to continue in future with studies into these problems.

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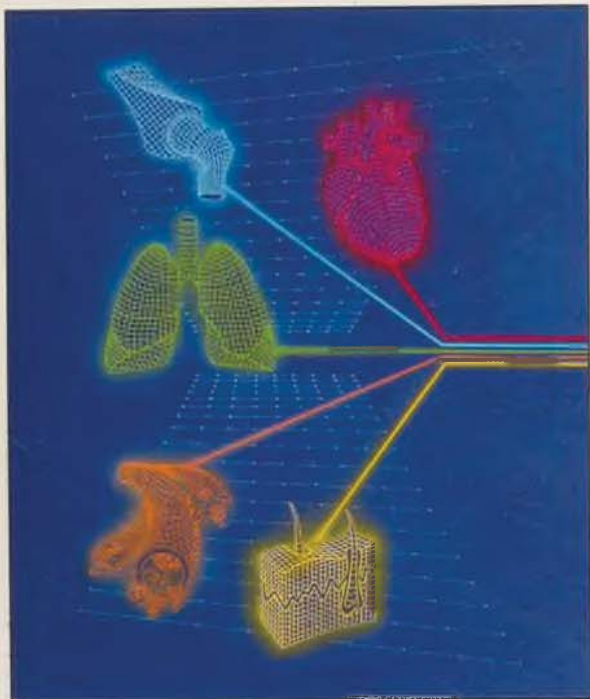
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