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REMOVAL OF WRINKLES AND REDUNDANT SKIN IN THE REGION OF THE FOREHEAD

V. M. EZROKHIN

In the literature (2, 5, 6) it is suggested, in order to remove wrinkles in the frontal region, to make the incision in the hairy part of the head, the motivation being the fact that the postoperative scar remains inconspicuous. Other authors (1, 4, 8 and others) propose to make incisions in front of the line of hairgrowth to conserve the previous proportions of the forehead.

However, an analysis of late results of surgical removal of wrinkles and redundant skin in the frontal region in the 160 patients examined (3) (128 were operated on using an incision in the hairy part of the forehead, 23 in front of the hairline) have the following results: in 102 out of 128 subjects an increase in the height of the forehead was observed, in 22 out of 32 its height was decreased. What caused the increase in the height of the frontal region during the operation? Examination of 400 patients seeking treatment for wrinkles in the face and neck showed that in 80% of them the height of the forehead was equal to 1/3 of the length of the face while in only 20% of the subjects the height of the frontal region was more or less than 1/3 of the length of the face. The conclusion was drawn that in a considerable part of the patients where the height of the frontal region made up 1/3 of the length of the face, the operation was performed using an incision in the hairy part of the forehead. Since after the removal of the redundant skin (hairy skin) with subsequent suturing of the edges of the wound hairline moves to a higher position, the height of the affected area also rises (Fig. 1 a and b). It is therefore possible to use the incision in the hairy skin only in patients the height of whose frontal region is less than 1/3 of the length of the face. When the incision is made in front of the hairline, a spindle-shaped portion of the skin of the frontal region is excised which, after subsequent suturing of the edges of the wound, lowers the height of the forehead (Fig. 1 c and d). The operation using an incision in front of the hairline can therefore only be carried out in patients where the

height of the frontal region exceeds 1/3 of the length of the face. Consequently, neither of these incisions is suitable for patients where the height of the frontal region is equal to 1/3 of the length of the face because the height of the forehead changes and the mean optimum variant must be found.

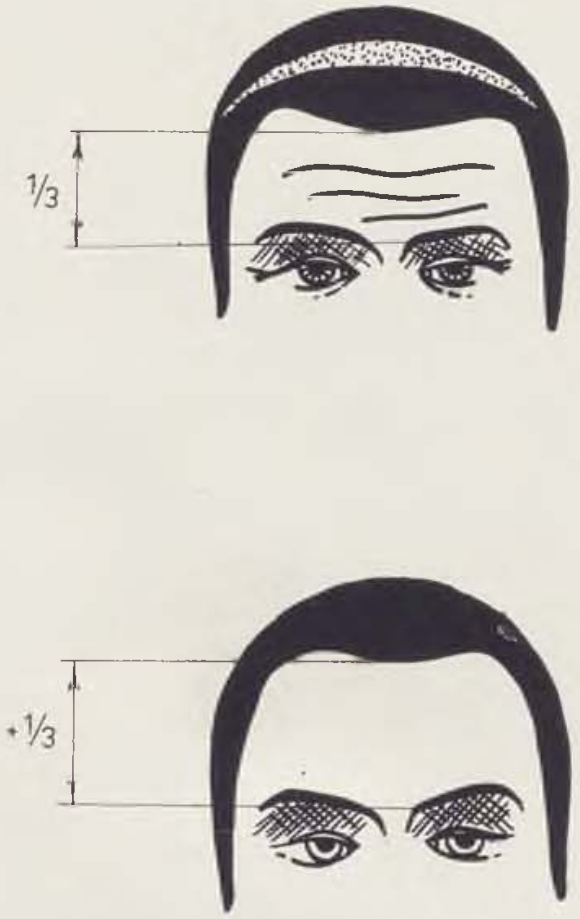

Fig. 1. Height of the forehead
a — equal to 1/3 of the length of face. A strip shaved in the hair from temple; b — more than 1/3 of the length of face after excision of the shaved strip with subsequent suturing of the edges of wound.

All the above mentioned authors recommend mobilization of the skin as far as the superciliary arches when removing wrinkles in the frontal region. However, an analysis of late results in the same 160 patients revealed the following: 80 out of the 128 patients where the operation was performed by means of an incision in the hairy part of the head complained about their eyebrows dropping and wrinkles reappearing in the frontal region, the nose bridge and the outer angles of the eyes only 1 1/2 to 2 years later. The same complaints were made in 15 out of the 32 subjects with the incision made in front of the hairline. The poor stability of the results can be explained by the use of the scheme of exfoliating the skin to the superciliary arches (at the bottom) and the vertical line from the ends of the eyebrows to the temples (from the

sides). That is why the indication for the operating aiming to the removal of wrinkles in the frontal region should be based not only on the presence of wrinkles in the regions of the forehead, but also on that of deep dropping eyebrows, wrinkles in the bridge of the nose and in the outer angles of the

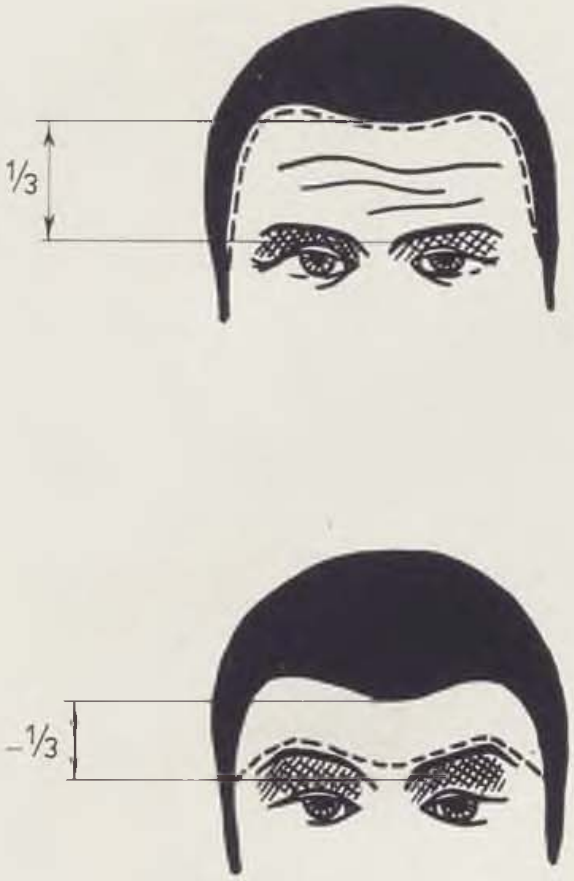

Fig. 1.c — equal to 1/3 of the length of face (the line in front of the hair growth according to which the incision is planned, is hatched); d — less than 1/3 of the length of face after incision in front of the hairline and excision of excess skin of the forehead.

eyes. In order to improve the result of operation and make it more lasting, an extensive mobilization of the tissues of the frontal region is necessary, embracing the regions of the brows, the bridge of the nose and the temporal regions. During the operation for the removal of wrinkles and folds in the frontal region, some authors (1, 7, 8, and others) recommend to operate on the frontal muscle as well, but no clear explanation has been given as to the indication to such an intervention which is not unimportant for the patients.

In the method proposed we are trying to remove what is still unclear. The method is essentially intended for patients with a height of the forehead equal to 1/3 of the length of the face although the general principles can be used in all the others as well. The operation is performed as follows: the upper third of the face — the frontal region (from the hairline to the bridge of the

nose) — is measured, and a strip 2 cm wide is shaved clean from the hairline, from temple to temple, its upper edge running in parallel with the hairline. The operative field is treated with 1% iodonate solution. After preliminary medicamentous preparation of the patient and infiltration anesthesia using

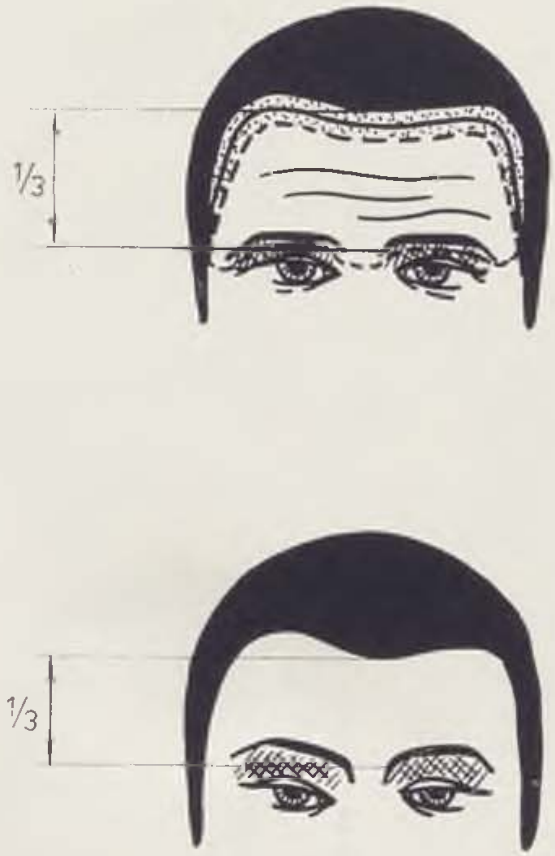

Fig. 1.e — equal to 1/3 of the length of face with a 2 cm-wide strip shaved close to the line of of hair growth; f — no change after operation since the excess skin was cut out equally in the hairy part and the forehead along the time of hair growth.

0,25% trimecaine solution with the addition of 5—6 drops of 1.1% adrenalin, an incision is made along the upper edge of the shaved strip from temple to temple with subsequent extensive mobilization of the skin of the forehead including the regions of the eyebrows, the bridge of the nose and the temporal regions. Thorough hemostasis is carried out.

Our expericence over more than 10 years has shown that the frontal muscle need not be operated on in all patients. If the wrinkles in the region of the forehead smooth out when the skin is stretched, there is no need to operate on the frontal muscle. On the other hand, if the wrinkles in the frontal region do not smooth out on stretching the skin, such an operation is necessary. The frontal muscle is dissected along the skin and separated from the bone at 1/2 of the height of the frontal region and dissected along the edges at the level of the external ends of the eyebrows.

When the skin is stretched after broad mobilization, the lower edge of the wound considerably overlaps the upper edge. Before cutting out the excess skin, we make three leading sutures: the first along the midline of the forehead and the remaining two along the vertical lines from the external ends of the brows. After putting in the leading stitches, the excess skin becomes clearly defined, embracing the shaved strip and the 2 cm-wide strip of the skin of the forehead. That is why the height of the forehead remains as before when the edges of the wound are sutured (Fig. 1, e and f).

Owing to wide exfoliation of the skin and with putting in the leading sutures, the eyebrows are also moved to a higher position and the wrinkles in the region of the bridge of nose, in the outer angles of the eyes and in the frontal region are smoothed out (Fig. 2). After putting in the leading stitches, the excess skin is cut out. The edges of the wound are sutured using supramide or another fibrous synthetic thread. The postoperative scar is hardly noticeable because it repeats the natural hairline and is situated close to the line of hairgrowth.

Fig. 2. Clinical observation.
a — height of forehead before operation equal to 1/3 of the length of face; b — 2 years after operation the height of face remained unchanged.

An analysis of recent results in 80 patients operated on by means of our method between 1980 and 1987 has shown that the height of the frontal region remains within the normal, the effect of the operation is marked and lasting, the postoperative scars are hardly noticeable.

SUMMARY

On the basis of an analysis of recent results in 160 patients operated on for the purpose of removing wrinkles and redundant skin from the region of the forehead, and of an analysis of the author's own material in 80 patients operated on by means of a method elaborated by the author conclusions were drawn concerning the incision used in this operation. The incision is carried out depending on the height of the frontal region. Indications for the intervention on the frontal muscle were determined. Directions concerning the extent of the operation were revised. It has been found that a more extensive, wide mobilization of tissues including the bridge of the nose, the regions of the eyebrows and the temples along with the frontal region, yields more pronounced and lasting results.

Key words: skin; frontal region; wrinkles; methods of removal

RÉSUMÉ

Au problème de supression de rides et de peau excessive dans la région du front

Ezrochin, V. M.

A la base des résultats de long terme, obtenus chez 160 patients opérés dans le but d'enlever les rides et la peau excessive de la région du front, et des analyses du matériau obtenu chez 80 malades qui ont été opérés selon la méthode élaborée par l'auteur, on a tiré conclusions por les interventions chirurgicales de même ordre. L'incision doit être effectuée en dépendance de la hauteur du front (région frontale). On a designé les indications pour l'intervention sur le muscle frontal. On a révisé les directives pour l'étendue de l'opération. On a constaté qu'une mobilisation de tissu plus volumineuse, plus vaste, impliquant aussi — à part la région frontale — la région supérieure de l'arête du nez, la région sourcilière et de la région temporale, donne les résultats plus importants et plus durables.

ZUSAMMENFASSUNG

Zum Problem einer Beseitigung von Runzeln und überflüssiger Haut im Gebiet der Stirn

Ezrochin, V. M.

Auf grund einer Analyse späterer Ergebnisse bei 160 Patienten, die zwecks Beseitigung von Runzeln und überflüssiger Haut im Gebiet der Stirn operiert wurden, sowie auf Grund einer Analyse des eigenen Materials bei 80 Patienten, die mit einer vom Autoren ausgearbeiteten Methode operiert wurden, wurden Schlussfolgerungen über den chirurgischen Eingriff bei der Ausführung dieser Operation gezogen. Der Schnitt wird in Abhängigkeit von der Höhe der Stirn (Gebiet der Stirn) ausgeführt. Bestimmt wurden Indikationen für den Eingriff an der Frontalmuskel. Revidiert wurden die Richtlinien für den Umfang der Operation. Festgestellt wurde, dass eine umfangreichere, ausgedehntere Mobilisierung der Gewebe, die gemeinsam mit dem Gebiet der Stirn auch das Gebiet des oberen Teils des Nasenbuckels, das Gebiet der Augenbrauen und das Gebiet der Schläfen umfasst, ausgeprägtere und länger andauernde Ergebnisse liefert.

RESUMEN

El removimiento de las arrugas y de la piel elcesiva

Ezrochin, V. M.

En la base análisis de les resultados obtenidos en 160 pacientes operados con el eliminar las arrugas y la piel excesiva desde ebla zona de la frenie y en la base del análisis del material propio obtenido de 80 enfermos operados por la técnica operatoria del autor hemos llegado a la decisión sobre la selécción de la técnica quirúrgica que se debe emplear en estos casos. La incisión se realiza en dependencia de la altura de la frente (la región frontal). Se establecieron las indicaciones para la intervención quirúrgica sobre el músculo frontal. Se revisaron los principios referentes a la extensión de la operación. Los resultados mostraron que la movilización de los tejidos más extensa y voluminosa, que incluye las regiones frontales tanto como la régíon de la parte superior del caballete de na lariz, la región de las cejas y la región temporal producen los resultados permanentes y satisfactorios.

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THE DOUBLE FOLDED PECTORALIS MAJOR MUSCULOCUTANEOUS FLAP FOR PHARYNGOSTOME CLOSURE CASE REPORT

P. TEPAVICHAROVA, K. J. ANASTASSOV

CASE REPORT

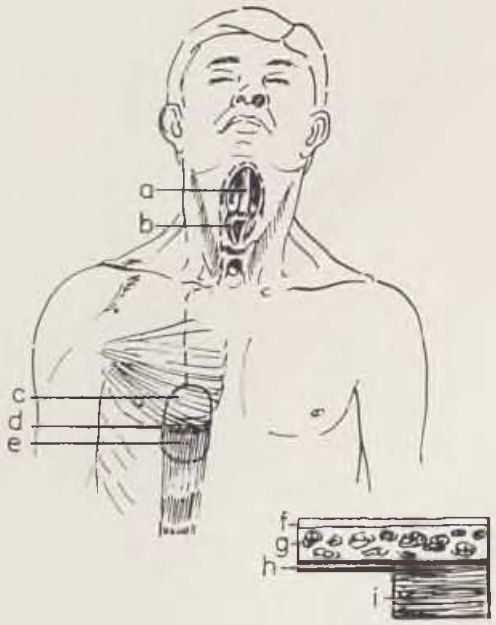
I. M. Z., a 54 year old male with carcinoma of the subglottis. Preoperative external beam radiation was followed by partial laryngectomy with preservation of the vocal cords. Postoperatively he developed a pharyngeal fistula. He was referred to the Department of Plastic Surgery 9 months later for closure of a 6×5 cm fistula. The patient was in poor general condition, being 15 kg below his ideal weight with concomitant electrolite and protein abnormalities. Following 15 days of intensive nutrition, reconstruction was performed. (Fig. 1)

A double-folded pectoralis major musculocutaneous flap was designed 6×12 cm (Fig. 2). The internal lining was produced from the upper half of the flap. Its borders were sutured to the four margins of the pharyngostome. The lower part of the flap consisting of skin and the upper sheeth of m. rectus abdominis (avoiding in this manner the bulkness of the flap) was used to cover the skin defect. The lower border of the flap was sutured to the posterior margins of the vocal cords in order to preserve the speech.

Postoperatively he commenced tube feeding at 3 days and oral at 15 days. The postoperative barium swallow was normal, and subsequent removal of the gastrostome tube was achieved. The patient continues to do well (Fig. 3).

DISCUSSION

One of the most common complications following laryngectomy is the pharyngeal fistula — 24 per cent according Wei et al. (1980). The most important factor for this complications is the radiotherapy. The presence of saliva, continuous mobile structures due to svallowing, no vitable tissue resulting from radiation posed serious problemes in pharyngeal reconstruction.



Fit. 1. The patient before the operation

Fig. 2. Schematic drawing outlining the flap and its constituents
a) gastrostome tube, b) vocal cords, c) for internal lining, d) deepithelization, e) for external lining, f) skin, g) subcutaneous fascia, h) aponeurosis m. rectus abdominis, i) pectoralis major muscle

Different techniques have been described for pharyngeal reconstruction (3, 5, 6) emphasizing the main principles. First the restoration of the pharyngeal tube and second the closure of the skin defect. When there is complete loss of the antero-lateral walls of the pharynx, reconstruction requires tissue from other areas: local flaps, pedicled trunk flaps, free microvascular tissue trasfer.

The pectoralis major flap described by Ariyan (1979) in combination with local flaps for lining have become one of the most used combinations of pharyngostome reconstruction. However local flaps produce significant complications as a result of poor tissue vascularization which requires staged operations. Combination of local and trunk flaps was described by Mazzola and Sambataro (1987). The folded pectoralis major flap has been described in oral cancer reconstructian by Blathena and Kavarana (1989).

This paper presents the folded pectoralis major flap on internal and external lining, reconstruction which to our knowledge, has not previously been described for pharyngostome closure.

Fig. 3. The patient 6 months later. The vocal cords are visible beneath the flap.

SUMMARY

A case is reported in which a double-folded pectoralis major musculocutaneous flap was successfully transfered for pharyngostome closure after partial horizontal laryngectomy. The double-folded flap was used for external and internal lining.

RÉSUMÉ

Lobe musculocutané de m. pectoralis major, plié en deux pour recouvrement de pharyngostoma. A propos d'un cas.

Tepicharova, P., Atanassov, K. J.

La description d'un cas où l'on a effectué avec succès une greffe du lobe musculocutanéde m. pectoralis major, plie en deux, pour le recouvrement d'un défaut (pharyngostoma) dû à la laryngectomie horizontale partielle. Le lobe, plié en deux, servait de tissu épithélial intérieur et extérieur.

ZUSAMMENFASSUNG

Übereinandergeschlagener Haut-Muskel-Lappen m. pectoralis major zur Abdeckung eines Pharyngostomas — Beschreibung eines Falles

Tepicharova, P., Atanassov, K. J.

Beschrieben wird ein Fall einer erfolgreichen Transplantierung eines übereinanderschlagenen Haut-Muskel-Lappens m. pectoralis major zur Abdeckung eines Defekts (Pharyngostomas) nach einer teilweisen horizontalen Laryngektomie. Der übereinandergeschlagene Lappen diente als äusseres und inneres Epithel.

RESUMEN

El empleo del colgajo cutáneo-muscular plegado de m. pectoralis mayor para cubrir faringoestoma — la descripción del caso

Tepicharova, P., Atanassov, K. J.

El papel describe un caso de la transplantación del colgajo cutáneo-muscular plegado de m. pectoralis mayor con el fin de cubrir el defecto (faringoestoma) después de la laringctomía horizantal parcial. El colgajo plegado sirvió como el epitelio interno y externo.

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MUSCULOCUTANEOUS FLAPS FOR THE TREATMENT OF CHRONIC OSTEOMYELITIS OF THE HEEL

D. STOCKAROVÁ, J. PILNÁČEK, J. RUBÍN, M. KOLAŘÍK

INTRODUCTION

The comprehensive approach to treatment for chronic osteomyelitis entails a whole series of diverse steps and measures aimed in particular at the removal of non-vital tissues, at the control of bacterial infection, and at improving tissue blood supply. The surgical treatment of ischeamic and infected wound defects seen in chronic osteomyelitis includes not only radical debridement but also vascularized tissue transfer to provide stable skin coverage as a prevention of local re-infection. These basic requirements can be met with maximum speed and safety by using mascular or musculocutaneous flaps. This method can deal with all the three main problems of chronic osteomyelitis: filling the chronic process cavity, improved focal blood supply, skin cover reconstruction (5). For surgical treatment for osteomyelitis in the heel bone region we found musculocutaneous flaps of the m. abductor digiti quinti (1) quite useful.

ANATOMICAL NOTES

M. abductor digiti quinti is a small muscle on the external plantar side of the sole. It takes its origin on the internal and external tubercles of the heel bone and is inserted to the external area of the base of the proximal phalanx of the fifth toe. Its motor innervation as well as blood supply arise from the external plantar neurovascular bundle. The skin above the muscle is innervated from the branches of the sural nerve. The arterial blood supply is provided by the lateral plantar artery localized between the m. abductor digiti quinti and m. flexor digitorum brevis (2, 3). Arising from the lateral plantar artery are two

small arterioles which enter the ball of the m. abductor digiti quinti in its proximal portion (Fig. 1).

Fig. 1. M. abductor digiti minimi with blood-supplying arteriole — A. plantaris lateralis.

SURGICAL TECHNIQUE

The surgical operation begins with radical excision and eradication of the inflammatory focus followed by mobilization of a skin flap on the outer surface of the sole, particularly at the site where the skin cover of the foot does not carry the weight of the body (Fig. 2). Continuing the incision we cut our way down to the muscle to mobilize it from its insertions on the external side of the sole, or from the base of the proximal phalanx of the fifth toe. We rotate the muscle with an island of skin to those places in the heel bone region where we need it for filling of the bone defect and for covering soft tissue defects (1, 4).

If we need a larger arch of musculocutaneous flap rotation (Fig. 2), we cut the lateral plantar artery distal to the origin of the two blood-supplying arterioles.

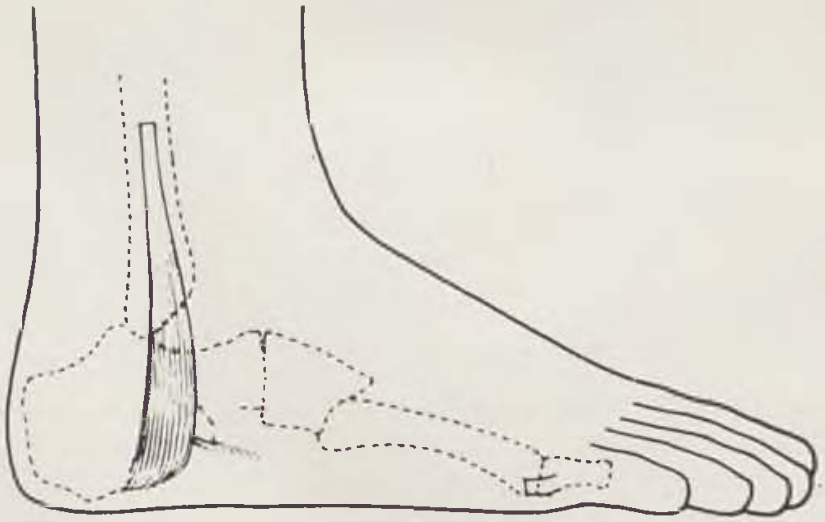
If the ball of muscle fails to fill the whole cavity, we use autologous spongy bone to fill part of the cavity (5). The spongy bone covered with a muscle ball heals in well and without complications.

RESULTS

Since 1983, we have treated at our respective clinical departments six patients suffering from chronic osteomyelitis of the calcaneus using musculocutaneous flaps of the m. abductor digiti quinti. The results are listed in the Table.

Table 1

patients treated	6
calcanei treated	7
men treated	4
women treated	2
mean age of patients	47 years
youngest patient	27 years
oldest patient	62 years
etiology of osteomyelitis	
a) traumatologic	6
b) hematogenic	1
mean period of healing	6 weeks
full exertion ability	in 6 weeks
mean period of follow-up	38 months (2—5 years)



— Fig. 2. Arch of rotation of m. abductor digiti minimi permits defect coverage in the region of external ankle.

One patient had both heel bones affected. Four of the patients were men, two were women. Their mean age was 47 years. In six cases osteomyelitis was caused by open fractures of the heel bone, in one the infection was due to hematogenic transmission. Union occurred within three weeks of the plastic operation, and the extremity was ready for full exposure within six of the operation. In

four cases we used the musculocutaneous island flap in combination with spongy bone filling. In all of four patients there was healing by first intention with no subsequent relapses.

DISCUSSION

In the foot region three muscles of the sole of the foot can be used for the treatment of a heel bone osteomyelitic focus: m. abductor digiti quinti, m. flexor digitorum brevis and m. abductor hallucis. The choice depends on the localization of the osteomyelitic focus for optimum distance in the rotation of the above-listed muscular flaps. At both our clinics we have so far treated laterally fistulizing osteomyelitis of the heel bone invariably by means of m. abductor digiti quinti musculotucaneous flaps.

None of our surgical patients have developed any complication of the avascular muscle necrosis type which, in this type of method, is always due to the wrong surgical technique or erroneous pre-operative planning.

Fig. 3. X-ray picture — dislocation open fracture of heel bone. — Fig. 4. X-ray picture — state after reposition and fixation with fixateur externe.

CASE REPORT

A 50-year old patient was referred to our orthopaedic department one week after a fall in the lift where he suffered dislocation open fractures of both heel bones (Fig. 3). Bilateral reposition and fixation with a Poldi 4 fixateur externe were effected (Fig. 4). Despite antibiotic treatment (oxacillin, gentamicin) and

other comprehensive anti-bacterial therapy for the primarily infected wound, osteomyelitis of both calcanei went on progressing (Fig. 5). Two years later both foci were filled with a m. abductor digiti quinti flap (Fig. 7, 8, 9). Linco-

Fig. 5. X-ray picture — the needle pointing at the osteomyelitic focus. — Fig. 6. Photograph — extent of skin defect and scaring in the neighbourhood of osteomyelitis focus.

Fig. 7. Schematic representation of the extent of the planned musculocutaneous flap.

Fig. 8. Photograph — circumcision and elevation of musculocutaneous flap with m. abductor digiti minimi. — Fig. 9. Photograph — state after defect closure with musculocutaneous flap.

Fig. 10. Photograph — state after healing after 5 years.

mycin was applied to combat persisting Staphylococcus aureus infection. Healing of the focus was noted at six weeks postoperatively when we permitted full use of the extremity. At a check-up five years later the patient was found without any signs of infection in either of the two heel bones and free to use his lower extremities to the full (Fig. 10, 11).

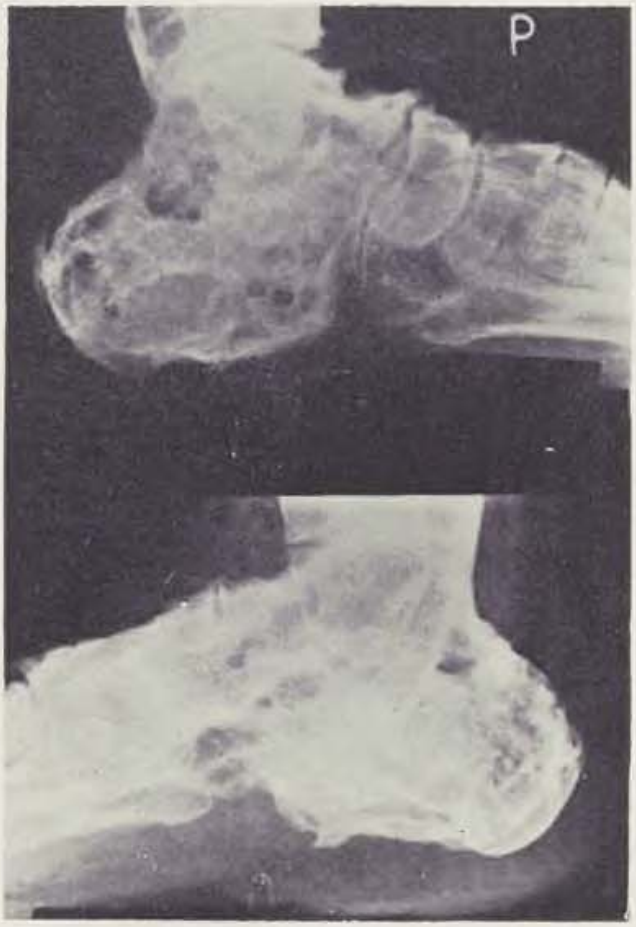


Fig. 11. X-ray of both heel bones — without infection signs.

CONCLUSION

In the course of the last six years we operated on six patients with chronic osteomyelitis affecting a total of seven heel bones. Soft tissue defect was present, too. Following radical surgical treatment of the osteomyelitic focus we covered the defect with a musculocutaneous island flap from the m. abductor digiti quinti. In four patients autologous spongy bone was used to help fill the bone cavity. Remission was achieved in all the patients. Stable skin coverage was ensured as an essential condition for a successful treatment of osteomyelitis.

SUMMARY

Treatment for chronic osteomyelitis with musculocutaneous and muscular flaps is a highly effective modern method. It is effective even in such unfavourable localizations as the calcaneus. The scope of use provided by muscles in the plantar region is wide enough to permit the treatment of foci in the heel bone of diverse localizations. The range of possibilities includes use of m. abductor digiti quinti. A muscular or musculocutaneous flap elevated from the muscle is well suited for the treatment of defects on the external side of the heel. The group consisted of six patients with osteomyelitis of seven heel bones operated on as described above at the authors' clinics between 1983 and 1987. One patient had both heel bones affected. The mean age was 47 years, ranging from 23 to 62 years. All of the patients showed clinical and X-ray signs of healing of the soft tissue defects and full remision of inflammatory complication. Control check-ups were made at 2—5 years postoperatively with an average postoperative period of 38 months. None of the patients developed any chronic osteomyelitis relapse at any point during that period.

Key words: muscular flap, osteomyelitis

RÉSUMÉ

Lobes musculocutanés dans le traitement d'ostéomyelité chronique du calcanéum

Stockarová, D., Pilnáček, J., Rubín, J., Kolařík, M.

Le traitement de l'ostéomyélite chronique à l'aide de lobes musculocutanés et musculaires se classe parmi les modes de traitement actuels hautement efficaces. Cette méthode est puissante même dans le site défavorable que représente sans doute le calcanéum. Les possibilités qui nous sont offertes par les muscles de la region de pied sont assez larges qu'on puisse résoudre les foyers de diversse localisations sur le calcanéum. Une des possibilite représente l'utilisation du muscle abductor dig. quinti. Les lobes musculaires ou musculocutanés ici prélevés sont appropriés au traitement des lésions situées du côte extérieur du talon. Dans notre groupe, il y a 6 patients avec l'ostéomyelité atteignant 7 calcanéum. Les patients ont été opérés à l'aide du muscle ci-desus, à nos cliniques, dans les années 1983—1987. Un malade présentait l'atteinte des deus calcanéens. L'âge moyen des patients était 47 ans, l'étendue d'âge étant de 23 à 62 ans. Chez tous les malades, les défauts des tissus mous on été guéris, les complications inflammatoires et les marques d'infection ont complètement regressées, du point de vue clinique et sous le contrôle radiographique. Les examens de contrôle étaient effectués avec un recul de 2 à 5 ans après l'intervention, le recul moyen étant 38 mois. Dans cette période, aucune récidive de l'ostéomyélite ne s'est présentée.

ZUSAMMENFASSUNG

Muskulokutane Lappen bei der Behandlung der chronischen Osteomyelitis des Fersenknochens

Stockarová, D., Pilnáček, J., Rubín, J., Kolařík, M.

Die Behandlung der chronischer Osteomyelitis mittels muskulocutaner und muskulärer Lappen gehört zu den effektivsten Methoden der modernen Medizin. Diese

Methode ist auch bei einer so ungünstigen Lokalisierung wirksam, wie es der Fersenknochen zweifellos ist. Die Möglichkeiten, die die Muskeln im Gebiet des Fusses bieten, sind ausreichend breit zur Lösung von Lagern am Fersenknochen von verschiedener Lokalisierung. Eine dieser Möglichkeiten ist auch die Anwendung des m. abductor dig. quinti. Der aus ihm gewonnene muskuläre oder muskulokutane Lappen eignet sich zur Behandlung von Defekten an der Aussenseite der Ferse. Wir führen eine Gruppe von 6 Patienten mit einer Osteomyelitis von 7 Fersenknochen an, die 1983 bis 1987 an unseren Kliniken mittels des obenerwähten Muskels operiert wurden. Bei einem dieser Patienten waren beide Fersenknochen betrofffen. Das Durchschnittsalter der Patienten betrug 47 Jahre der Altersunterschied 23 bis 62 Jahre. Bei allen Patienten kam es zu einer Heilung des Defekts der weichen Gewebe sowie zu einem völligen Zurücktritt der entzündlichen Komplikationen und Anzeichen einer Entzündung, sowohl klinisch wie röntgenologisch. Eine Kontrolluntersuchung wurde mit einem Zeitabstand von 2—5 Jahren ab der Operation vergenommen, wobei die durchschnittliche Zeit seit der Operation 38 Monate betrug. Bei keinem der Patienten kam es zu dieser Zeit zu einer rezidive der chronischen Osteomyelitis.

RESUMEN

Los colgajos musculocutáneos en el tratamiento de la osteomielitis crónica del hueso del talón

Stockarová, D., Pilnáček, J., Rubín, J., Kolařík, M.

El tratamiento de la osteomielitis crónica por medio los colgajos musculocutáneos y musculares en una de los modos más eficiences en el tratamiento moderno. Este método se puede emplear con éxito también en el caso de la localidad desfavorable que es sin duda el hueso del talón. Las posibilidades, ofrecidas a nosotros por los músculos de la región de la planta del pie, están bastante grandes para solucionar la manera del tratamiento de los focos del hueso del talón en varias localidades. Una de estas posibilidades es el empleo del m. abductor dig. quinti. El usa de su colgajo muscular o musculocutáneo está conveniente por el tratamiento de los defectos situados en la parte exterior del talón. Nuestro grupo de los enfermos contuvo 6 pacientes con la osteomielitis de 7 huesos del talón, quienes fueron operados con ayuda del dicho músculo en los años de 1983 hasta 1987 en nuestras clínicas. Uno de estos pacientes tuvo ambos huesos del talón afectados. La edad media de los enfermos fué 47 años, es decir entre 23 y 62 años. El defecto de los tejidos blandos en todos los pacientes fue curado y se observó le remisión total de las complicaciones infecciosas y tanto como de la inflamación desde del punto de vista clínica y radioscópio. Las examinaciones de control se efectuaron dentro del período de 2—5 años después de la operación, la edad media después de la operación fué 38 meses. Dentro de este período no ocurrió ninguna reciída de la osteomielitis crónica.

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USE OF THE DISTRACTION METHOD IN HAND SURGERY

Š. GUZANIN

Considerable success has been achieved in reconstructive surgery of the hand over the past three decades. Despite this record, clinical practice is still confronted with some unmanageable problems in cases of severely damaged hands.

Countless reports of the restoration and improvement of the function of the hand have been written to far. There of descriptions of different methods for the pollicizacion-transposition of fingers in place of the missing thumb, phalangization of the metacarpi, transplantation of digits from the foot to the hand, different techniques of flap plastic operations, and so on. Restoration of the function of the hand remains an open problem particularly in those cases where in addition to the absence of the thumb other fingers are missing too, and where the fingers are absent while the thumb has been preserved.

For more than twenty years now, reports of the possibilities of bone and soft tissue lengthening have been appearing in the relevant professional literature. In 1965, Ilizarov (3) proposed, experimentally tested and introducted into clinical practice, the method of bloodless extremity lengthening at the expense of growth plate distraction. The method was put into its first use by the Bulgarian surgeon Matev (6) two years later for lengthening the first metacarpus following loss of the thumb. Step by step the method came into a wider use at different centres of surgery world wide (2, 4, 5, 8. 9). At our own centre we have been using the distraction method for hand bone lengthening since 1987.

MATERIAL AND METHODS

At first we were unable to exploit the principle of hand bone lengthening because of the invailibility of small distractors. Under pressure of patients and their relations we had to look for a suitable solution. Going by his own sketch and design, a relative of one of our patients constructed one and, later on, two more prototypes of a miniature distraction apparatus on the principle of the comprehensive distractor designed by Ilizarov and his co-workers (3). These

"do-it-yourself" devices are in some ways different from the distractors used by Matev (6), Godunova (2), Maňák (5), Ulitski (9) and others.

The first prototype miniature distractor consists of two screws allowing the movement of one or two arches with holes for Kirschner wires, 1.2 mm in diameter, turned by a tetragonal key. The proximally localized pilot arch is fixed. The screw in this part has no threads and the arch is secured with two nuts, or else the pin can have a flared end. By turning the screw to the right over 360 degreees the mobile, wire-bearing arches are removed from the pilot arch by 0,7 mm.

The other distractor prototype is composed of two screws allowing for the movement of wire carriers fixed by means of a metal disc in groove-like notches by means of a nut. The wire carriers are drawn away over the necessary distance by turning the nuts on the screws. The screws are exchangeable as needed on the bone length. It is also possible to use a pilot arch to secure equal distance between the left and right wire carriers.

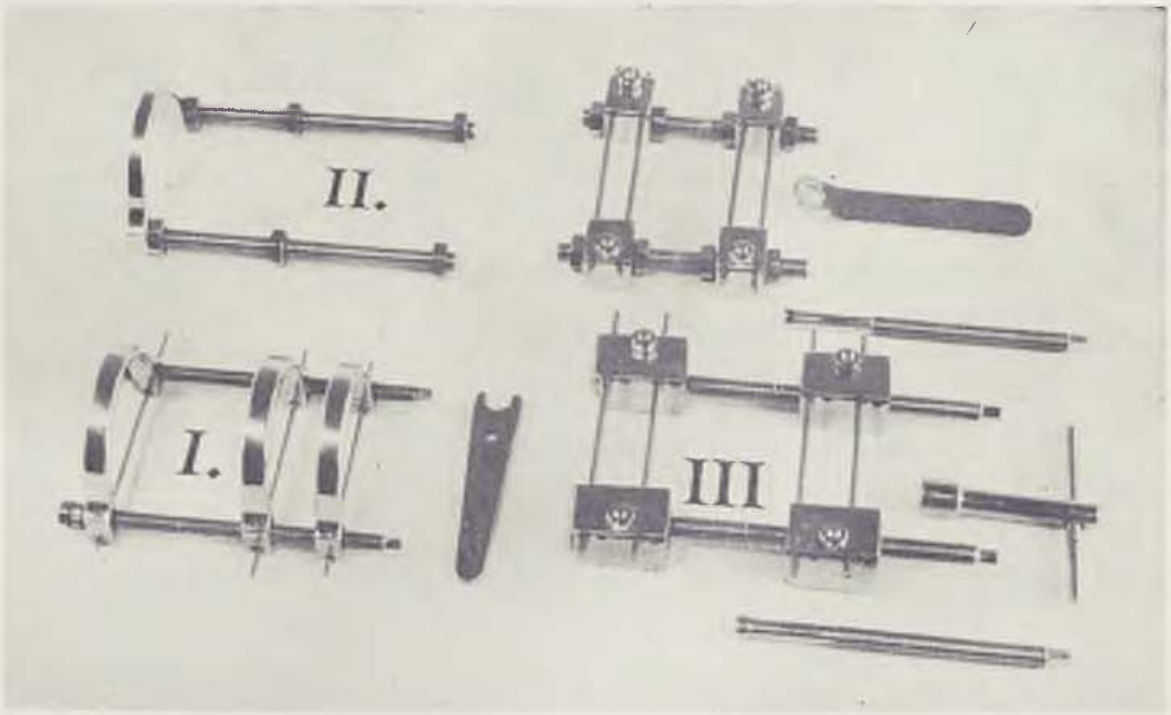

Fig. 1. Three prototypes of miniature distraction apparatus

The third prototype of a miniature distractor consists of two screws, each with a hole a tetragonal pin at the end. The wire carriers, each with four groove--like notches for a variable accommodation of the wires, are drawn away from each other by turning the screews with in pin inserted in the end holes. The screws can be exchanged depending on the length of the bones (metacarpal or phalangeal bones). All component parts of the devices were made of stainless steel resistant to all modes of sterilization (Fig. 1).

Over a period of three years, we used the miniature distractors of our own design in 13 cases, Ilizarov's original apparatus in three cases: to lengthen the 1st metacarpus in 7 cases, the 2nd metacarpus in two cases, the 2nd to 4th metacarpi in one case, the 2nd to 5th metacarpi also in one case. Similarly, there was one case each of lengthening the proximal and medial phalanges of the fingers. Ilizarov's device was used in two cases for lengthening bones of the forearm in congenital hypoplasia of the radius and ulna and, in one case for metatarsal elongation in a case of congenital aplasia of the toes, and hypoplasia of the rest of the bones of the foot (Table 1).

CASE REPORTS

Out of the total number of 16 patients, we have chosen the following cases to demonstrate the surgical approach and the therapeutical course.

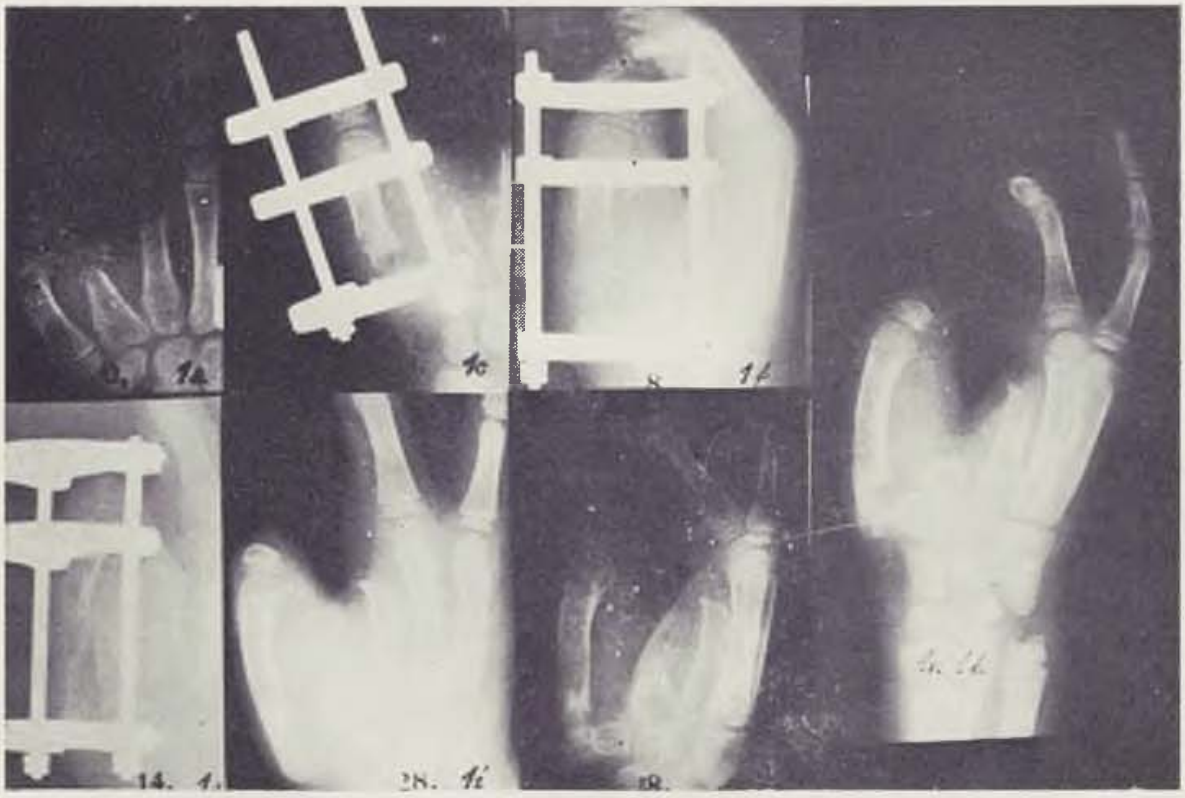

Fig. 2. Patient N. O., 11 years-old, condition, after accident, 3 weeks after introduction of the apparatus, 8, 14, 28 weeks and 1 year after surgery

Case 1: in an eleven-year old boy (N.O.), a detonator explosion resulted in a loss of the thumb, the second, third and partially also the fourth fingers of the right hand. Five months after the accident, with the patient in general anaesthesia, the distractor (prototype 1) was placed on the 1st metacarpal

Tab. 1. Surgical patients

Patient:	Age:	Cause:	Diagnosis:	Duration of phases:				Lengthening
				I	II	III	IV	
				days		weeks	months	cm
1. N. O.	13	detonator	amputation of the thumb, 2nd, 3rd and distal phalanges of the 4th right hand finger	7	8	7	6	3.5
2. S. M.	14	gas cylinder	amputation of the thumb and the 3rd left hand finger	10	9	8	6	3.0
3. S. M.	40	circular saw	amputation of the thumb, 4th and 5th left hand fingers	14	7	8	8	3.5
4. B. T.	23	press	amputation of the thumb and the 2nd right hand finger	14	6	8	8	3.7
5. K. M.	13	congenital defect	strangulation amputation of the distal 1/3 of the 3rd and 4th right hand fingers	3	9	6	4	3. 2.5 4. 1.5
6. H. M.	38	mincing machine	amputation of the 2nd—5th right hand fingers	16	6	7	4	2.0 2.5
7. P. J.	38	metal sheet corrugator	amputation of the thumb, the 2nd—5th fingers and of the IIIrd—Vth metacarpus of the right hand	15	6	12	8	3.0
8. B. F.	21	circular saw	amputation of the 4th and 5th fingers, partial amputation of the 2nd and 3rd left hand fingers	14	7	8	6	3.5
9. L. J.	32	circular saw	amputation of the right hand thumb	14	8	8	8	3.0
10. M. Š.	24	power hammer	amputation of the left hand thumb	14	13	7	6	3.5
11. R. T.	6	congenital defect	hypoplasia of the 2nd — 5th left hand fingers	apparatus removed after a week				
12. Š. V.	20	congenital defect	hypoplasia of the right hand and forearm/aplasia of thumb and radial hypoplasia)	18	16	12	12	10.0
13. E. J.	15	grinding mill	amputation of the thumb and of the 5th left hand finger	25	8	9	6	3.0
14. D. S.	14	congenital defect	hypoplasi aof left foot	21	14	16	10	8.0
15. J. V.	7	axe	amputation of the 2nd — 4th left hand fingers	14	8	9	6	3.0
16. G. A.	26	congenital defect	bilateral radial hypoplasia	14	18	still under treatment		

bone of the injured hand. 1.2 mm Kirschner wire was introduced into the holes of the pilot arch localized proximally and through the base of the 1st metacarpal bone using hand drills from the Poldi 5 set under optical control using an X-ray miniscope. The other wire was drilled in through the metacarpal diaphysis, and the third through the remainder of the proximal phalanx of the thumb and the holes in the distal arches. By turning the screws we managed to interrupt the growth plate to achieve intraoperative epihyseolysis, separation of the metaphysis from the epiphysis by 1—2 mm. On postoperative day 7, we started distraction of the fragments twice daily, each time by a half turn of the screw, i.e. 0.7 mm. The boy was released for domestic care and resumed going to school. His parents were instructed on the use of the distractor. We saw him regularly at intervals of 2—4 weeks. The bone lengthening process was X-ray checked. In case pain developed, the distraction was interrupted for 1—2 days, or else the elongation was distributed to four quarter-turns daily. Thus, a lengthening of 3.5 cm was achieved in 8 weeks. Owing to pressure exerted on the wire inserted into the base of the 1st metacarpus, the metacarpus was partially displaced in its articulation with the ossis trapezoideum. After seven weeks of the resting phase, the distractor could be removed. X-ray pictures showed spontaneous osteogenesis so advanced so that the patients was able to make active functional use of his right hand (rehabilitation). At a check-up seven months later, we were able to see the end of ossification of the lengthened portion of the metacarpus (regenerate). Right-hand grasp was restored, thus improving function (Fig. 2).

Case 2: A twenty-three year old man (B.T.) suffered loss injury of the right hand after his thumb and index finger were crushed in a press. Eight months after the accident a 3 cm skin incision was made on the radial side of the 1st metacarpus using local anaesthesia. Under visual control one wire was introduced into the upper third and two wires into the lower half of the metacarpus. The distractor of the third prototype was placed in, and osteotomy performed between wires 1 and 2. The skin wound was sutured. On the following day the patient was released for domestic nursing as an out-patient. The sutures were removed after two weeks and gradual distraction of 1 mm daily was commenced. Thus a lengthening of 3.7 cm was achieved in six weeks time. After eight weeks of spontaneous osteogenesis the device was removed and the patient continued active rehabilitation of his right hand. After six weeks, X-ray pictures showed an advanced stage of ossification of the regenerate. A deepening of the space between the 1st and 3rd metacarpal bones with the aid of a free-skin transplant the function of the right hand was partially restored. The patient was able to resume his previous job as press operator (Fig. 3).

Case 3: a 38-year old woman (H.M.), all her fingers of the right hand destroyed, while operating a power-driven mincer. Three and a half months after the accident, a distractor was placed on her right hand with the proximal wire introduced into the capitula of metacarpi II—V, another wire through the bases of the proximal phalanges and a third still more distalward. Between the second and third wires an osteotomy using 2 cm skin incision was per-

formed on the dorsal side of the stumps of the amputated fingers. Leangthening of the more distalward placed fragments of the proximal phalanges was started at two weeks from the operation. After three weeks of distraction we found that the wire had cut its way through the distal portions of the proximal phalanges of digits 3 to 5. We continued lengthening the phalanx of digit 2 alone since only the left-sided wire carrier was being displaced while on the right side is was left in its original position. As a result there was a partial deviation of the elongated portion in the ulnar direction. A lengthening of 2.5 cm of the proximal phalanx of the index was achieved in a six-week time. After another seven weeks the distractor could be removed. This was followed by separation of the stumps of digits 2 to 5, using free-skin grafts. After some time the ulnar deviation of the index was rectified. The patient is able to perform all her domestic duties, she can even embroider and has resumed her original job in the kitchen of a school canteen (Fig. 4).

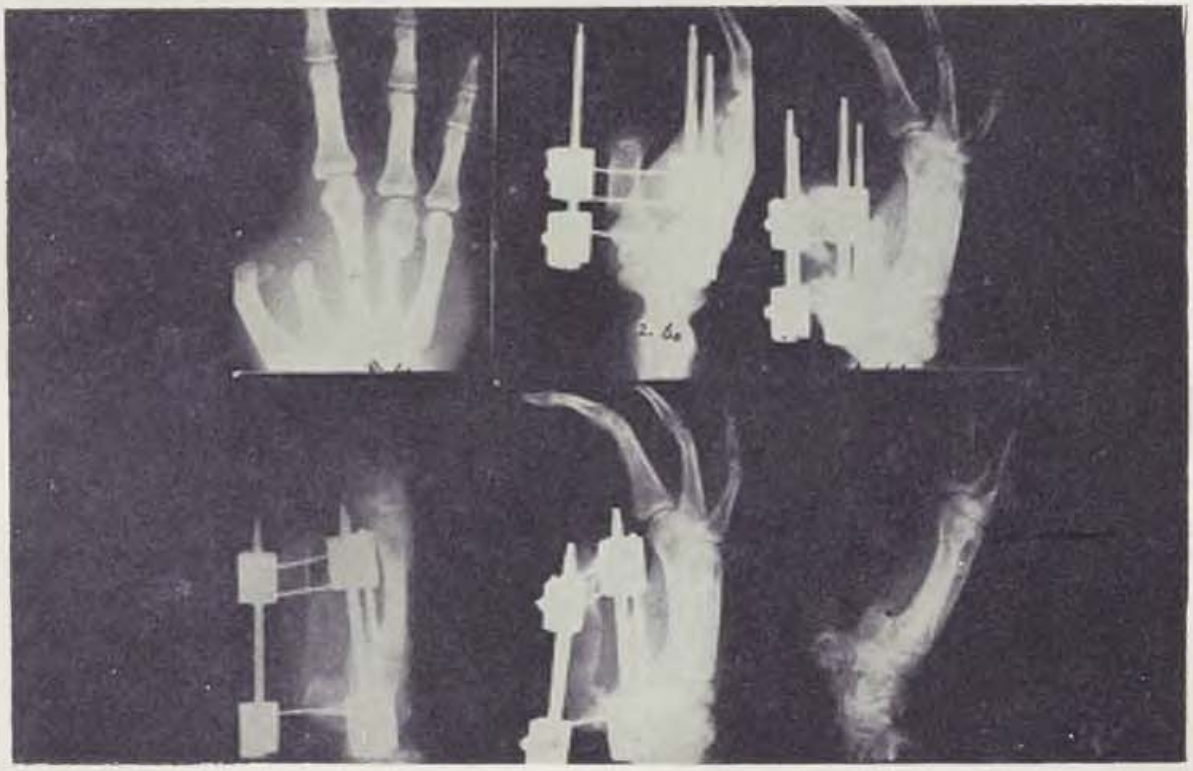

Fig. 3. Patient B. T., 23 years old, candition after accident, 4, 6, 14 and 16 weeks after surgery

C a s e 4: a thirteen-year old boy (K.M.) suffered from a congenital developmental defect — strangulation (amniotic) amputation of the medial and distal phalanges of digits 3 and 4 of the right hand. Of the medial phalanges

only the proximal third was developed. Between the ages of 1—3 years, the boy had the fingers concerned separated and the interdigital spaces deepened using local plastic surgery with full-thickness skin transplantation. At the age

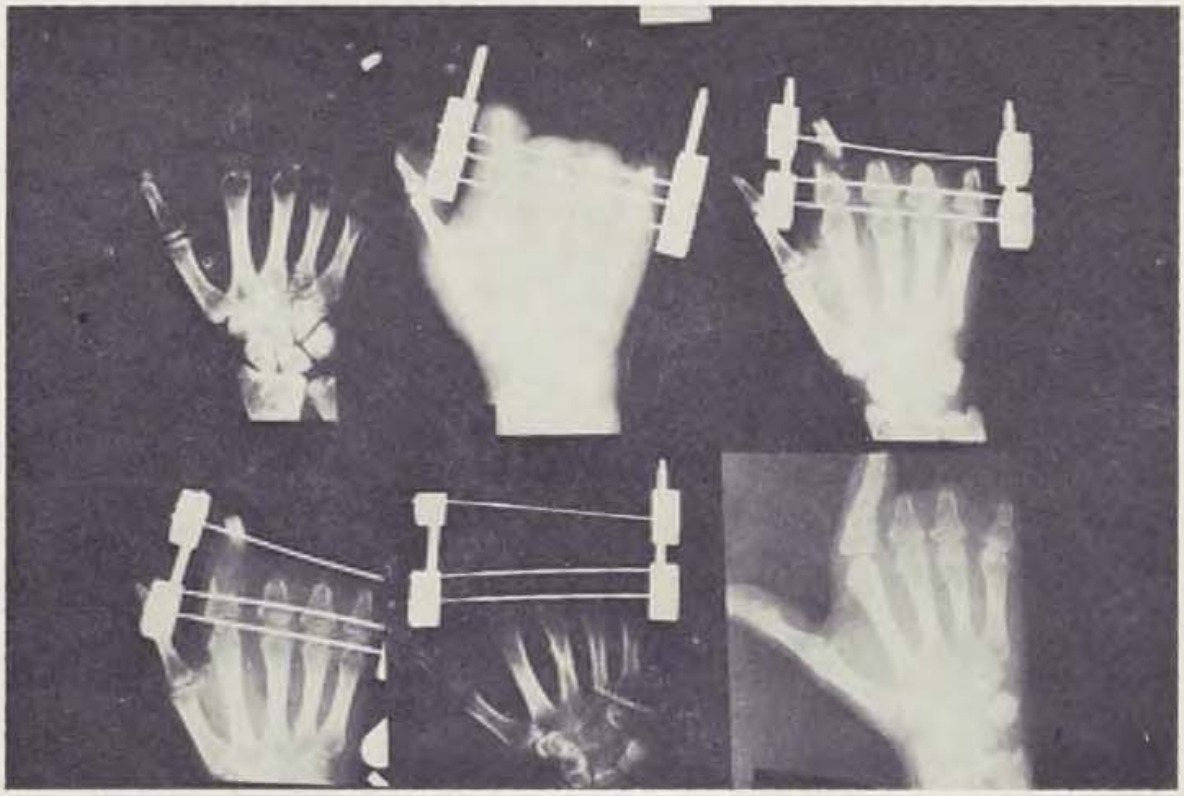

Fig. 4. Patient H. M., 38 years old, condition after accident, introduction of the apparatus, 4 and 8 weeks and 5 months after surgery

of thirteem the boy became dissatisfied with the aesthetic apearance of his hand and started insisting on further treatment. Both he and his mother were instructed on the principle of the method of distraction and gave her consent to the strategy proposed to them. With the patient in general anaesthesia, three Kirschner wires wede introduced, one through the distal third of the proximal phalanx, another through the epiphysis of the hypoplastic medial, though in this particular case, the terminal phalanx, and yet another one through the metaphysis of this phalanx of digits 3 and 4. Because of the presence of a still active growth plate, gradual distraction of twice 0.5 mm daily, it was possible to achieve epiphyseolysis and, over a period of eight weeks, a lengthening of 2.5 cm on digit 3, and 1.5 cm on digit 4. Spontaneous osteogenesis came to an end after six weeks. Regeneration of the lengthening phalanges was over after four months. We succeeded in lengthening digit 3 to nearly the level of the tip of the index, and digit 4 to the tip of the little finger. Both the boy and the mother are happy with the results (Fig. 5).

DISCUSSION

On the basis of our own clinical observation as well as literary data, we can divide the process of hand bone lengthening into four phases.

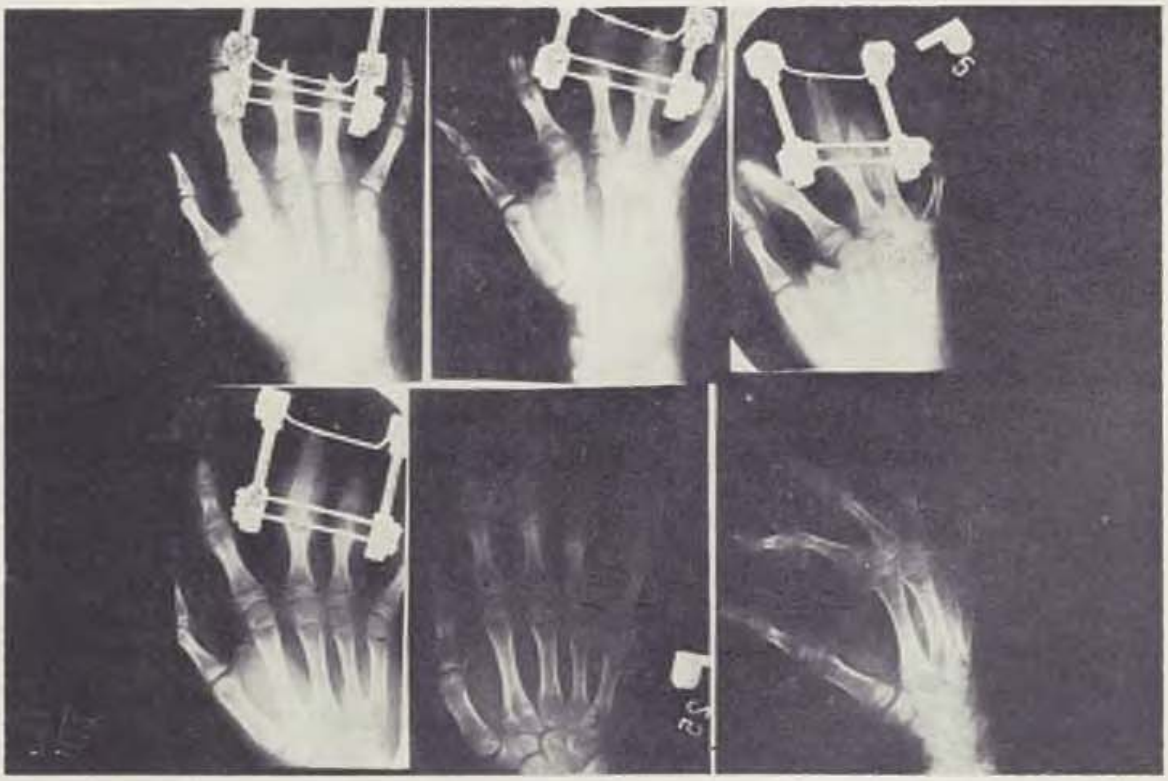

Fig. 5. Patient K. M., 13 years old, condition after introduction of the distractor, 5, 9 and 12 weeks following surgery

P h a s e I — the pre-distraction phase is the period between the mounting of the distraction device and the start of distraction. In our cases this phase lasted seven to fourteen days. In this particular phase the conditions for the formation of the regenerate are about the same as in fracture healing following meticulous reposition and external fixation. The optimum start for distraction is the period of union-formation all over the surface of the fragments in the phase of osteogenic tissue proliferation until the onset of growing ossification (2, 7, 9). In the epiphyseo-metaphyseal portion this amounts to a period of 5—7 days, after intraoperative epiphyseolysis and in the diaphyseal portion — 10 to 14 days, starting from intraoperative subperiostal osteotomy.

P h a s e I I — the distraction phase, takes the form of a single-time or repeated distancing of the fragments at a rate of 0.5 to 1.0 mm daily with periodic intermission of 1—2 days in case the patient feels pain at the site of wire insertion. During gradual distraction the connective tissue bridge span is

lengthened and the fibres are patterned lengthwise. Under the effect of distraction there are changes in the regenerate microcirculation with new blood and tissue fluid passages coming into existence in the distriction of the diastasis. This secondary extension of microcirculation is responsible for prolonged reparative reaction — formation of fibrous bone trabecula on the basis of immature connective tissue fibres in what is known as early desmal ossification (7, 9). Given suitable condition of diastatic filling, the distraction regenerate formation continues with the production of length-wise orientated trabecula at the interface between the bony portion of the regenerate and the connective tissue layer. The regenerate can only be lengthened by continuously drawing the fragments away from each other. In our cases this particular phase lasted six to sixteen weeks.

P h a s e I I I — the fixation phase-is characterized by an end to the formation of the capillary bed and its insipient reaction in the sense of reduction. The fibrous structures are increasingly discernible while the rate of replacement by newly grown bone is the decrease in what is called late desmal ossification. Hence the period of terminating ossification of the connective tissue interface appears to be longer than the phase of distraction. We were able to see that the thicker the connective tissue interface and the higher the degree of fibrotization, the more time was necessary for the regenerate ossification to come to an end. For a satisfactory course of secondary ossification it is necessary to keep the distanced fragments in the correct position by means of stable fixation while maintaining a dynamic functional exercise of the hand. Once the ossification process is over, the distraction-fixation apparatus can be removed and active functional rehabilitation begun. The length of the fixation phase is rather variable — in our cases anything from six to sixteen weeks. So long as the period of fixation does not exceed that of distraction, the conditions of repair processes in the previous phases can be regarded as optimal.

P h a s e I V — the rehabilition phase — begins with the removal of the distractor and ends with the termination of the complete anatomical restructuring of the newly grown bone. Again, this phase may last differently long, in our cases from four to twelve months depending on whether and how the organization and production of the regenerate match the functional load. The strenght of the distraction regenerate was compared with neighbouring healthy bones at regular X-ray check-ups.

CONCLUSION

The method of lengthening the bone of the hand and forearm was found fully useful at our clinical centre. The "do-it-yourself" made and practically tested miniature distractors meet the conditions for the gradual distraction, external fixation and, if needed even compression of the fragments. The range of use in surgical practice is much wider, e.g. in the treatment of fractured bones of the hand, different congenital or acquired deformations of the hands, and even in cases of soft tissue contractures.

Using this method we can achieve sufficient and essential elongation of the metacarpal bones of phalanges of the fingers of the hand while preserving all forms of skin sensitivity. In the course of the gradual distraction of the metacarpus or phalanx, the newly formed regenerate fills the bone defect eventually to assume the shape and structure of bone in the process of restructuring. Using this method we can lengthen bones of the hand by as much as 3—4 cm. To achieve the desired result however, we badly need our patients' reasonable cooperation and patience.

SUMMARY

The author describes three prototypes of a miniature distractor for the bones of hand constructed according to his own design, and its uses in clinical practice. The distractors are used for lengthening bones of the hand after injuries involving loss of the thumb or fingers, and for the treatment of patients with congenital developmental defects of the hand. Over a period of three years, the distractors were used in thirteen cases and Ilizarov's original apparatus in three cases: for the lengthening of metacarpus I in seven cases, metacarpus II in two cases, metacarpi II—IV in one case, metacarpi II—V also in one case. Similarly, in one case each for the elongation of the proximal and medial phalanges of fingers. A lengthening of 3.5 to 3.7 was achieved. Ilizarov's apparatus was exploited in two cases to lengthen the bone of the forearm for congenital hypoplasia of the radius and ulna, and for metatarsal bone lengthening in a case of congenital aplasia of the toes and hypoplasia of the remaining bones of the foot. In the last three cases a lengthening of 10 cm was achieved.

Key words: distraction, fixation apparatus, distraction method, lengthening of the bone of the hand and forearm.

RÉSUMÉ

Utilisation de la méthode d'extension dans la chirurgie de la main

Guzanin, S.

Dans son travail, l'auteur décrit trois prototypes d'un appareil miniature d'extension pour les os de la main, et son utilisation dans la clinique. Les appareils sont construit d'après les projets de l'auteur. Ils sont utilisés pour l'allongement des os de la main des patients qui ont subi des traumatismes de perte digitale ou du pouce et des patients avec les malformations congénitales de la main. Au cours de trois années, ces appareils ont été utilisés dans 13 cas et l'appareil original d'Ilizarov dans 3 cas. Les appareils étaient appliqués pour l'allongement du premier métacarpien dans 7 cas, du deuxième métacarpien dans 2 cas du II.—IV. métacarpiens dans 1 cas, du II.—V. métacarpiens dans 1 cas également. Parreilement, pour l'allongement des phalanges proximales et médiannes des doigts de la main, les appaireies étaient utilisés en 1 cas. L'allongement obtenu était de 3,5 à 3,7 cm. L'appareil d'Illizarov était appliqué pour l'allongement des os de l'avant-bras dans 2 cas, à cause d'une hypoplasie congénitale du radius et du cubitus, et en un cas pour l'allongement des métatarsiens chez l'aplasie congénitale des doigts et chez l'hypoplasie des autres os ou membre inférieur. Dans les trois derniers cas, on a obtenu l'allongement de 10 cm.

ZUSAMMENFASSUNG

Ausnutzung der Distraktionsmethode bei der Chirurgie der Hand

Guzanin, S.

Der Autor beschreibt in der Arbeit drei Prototypen des Miniaturdistraktionsapparats für die Knochen der Hand gemäss seinem eigenem Vorschlag sowie dessen Ausnutzung in der klinischen Praxis. Er nutzt diese Apparat e bei einer Verlängerung der Knochen der Hand bei Patienten aus, die verlustreiche Verletzungen des Daumens oder der anderen Finger erlitten haben, sowie bei Patienten mit angeborenen Entwicklungsfehlern der Hand. Im Verlauf von drei Jahren wurden sie in 13 Fällen ausgenutz und der Original-Ilizarov-Apparat in 3 Fällen;, zur Verlängerung des I. Metakarpus in 7 Fällen, des II. Metakarpus in 2 Fällen, des II. bis IV. Metakarpus in 1 Fall, des II. bis V. Metakarpus in 1 Fall. Weiters auf ähnliche Weise in je 1 Fall der Verlängerung der proximalen und medialen Glieder der Finger. Erzielt wurden Verlängerungen um 3,5——3.7 cm. Der Ilizarov-Apparat wurde in 2 Fällen zur Verlängerung der Knochen des Unterarms zur kongenitalen Hypoplasie des Radius und der Elle ausgenutz und in 1 Fall zur Verlängerung der Metatarsen bei kongenitaler Aplasie der Finger und Hypoplasie der sonstigen Knochen des Fusses. Bei den letzten drei Fällen wurde eine Verlängerung um 10 cm erzielt.

RESUMEN

El empleo del método de distracción en la cirugía de la mano

Guzanin, Sh.

En su papel el autor describe tres prototípos del aparato miniatura de distracción aplicado al hueso de la mano el que construyó según su diseño propio y su empleo en la práctica clínica. Estos aparatos se emplean para la prolongación de los huesos de la mano en los pacientes con la pérdid del pulgar o de los dedos y en los pacientes con la pérdida del pulgar o de los dedos y en los pacientes con los defectos congénitos de la mano. Durante el período de tres anos estos aparatos fueron empleados en 13 casos y el aparato original de Ilizarov en tres casos: para prolongar el metacarpo I en 7 casos, el metacarpo II en 2 casos, los metacarpos II—IV en un caso y los metacarpos II—V también un un caso. De un modo parecido, dos enfermos tuvieron prolongados los falanges proximales y mediales de los dedos de sus manos. Se logró la prolongación de 3.50—3.7 cm. El aparato de Ilizarov fué aplicado en dos casos con el fin de prolongar los huesos del antebrazo por causa de la hipoplasia congénita del radio y de la ulna y para prolongar los metatarsos en un paciente con la aplasia congénita de los dedos del pie y con la hipoplasia de los otros huesos del pie. En los últimos tres enfermos la prolongación llegó a 10 cm.

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PROBOSCIS LATERALIS TYPE IV — A REPORT FROM THE INDIAN SUBCONTINENT

A. GOVILA

Proboscis lateralis is a rare congenital anomaly initially reported in Caucasians but now seen in other races as well. The appendage is regarded as the soft tissue part of the nose whose proximal end remains attached in the area of the inner canthus. Many atypical attachments, such as outer canthus in the midline root of the nose and the chin have been described. Proboscis a fleshy, clublike structure lined inside by stratified columnar epithelium.

The nose on the ipsilateral side is hypoplastic or may have aplasia. The defects of cleft lip and palate, eye and adnexa may be associated with it. After reviewing world literature, only 34 cases were described by Boo Chai from Singapore who — on the basis of the associated congenital anomalies in the tissues around the nose — classified them into four types.

TYPE I — Proboscis lateralis with a completely normal nose (3 cases).

TYPE II — Proboscis lateralis with ipsilateral deformity (8 cases).

TYPE III — Proboscis lateralis with ipsilateral deformity of the nose, eye and/or adnexa (16 cases).

TYPE IV — Proboscis lateralis with deformity of the nose and eye associated with cleft lip and/or palate (7 cases).

It is rather interesting that in this comprehensive study there is no case report of type IV deformity from the Indian subcontinent. Since we treated one case of this type two years ago — an Indian boy — and as we used a technique not described before, we report it here.

This report is of interest from several points of view In the first place, reconstructions of such a severe deformity is a great surgical challenge, and, in the second place, the method employed has not been reported so far.

CASE REPORT

The patient was an Indian boy, 6 months old, whom I examined in December 1986. He had the following congenital anomalies (Fig. 1):

Fig. 1 — A, B, C — Pre-operative picture of a six-month old Indian child with Proboscis lateralis, type IV.

1. A right-sided proboscis lateralis that was 1.5 cm long and 1 cm in diameter attached very close to the right side of medial canthus. A well-formed canal of the nostril, up to 1 cm deep, ending in a blind sac, could be seen.

2. Hemi-nasal aplasia on the ipsilateral side.

3. Contralateral cleft lip and cleft alevolus.

4. Hypertelorism and early stages of hydrocephalus.

5. Contralateral defects of the nostril floor, alae and part of the cheek in continuity.

6. Loss of columella.

There was no history of cleft lip or palate or other congenital anomalies in the family. The patient was the firstborn male child of the family. Mother was perfectly well during pregnancy and it was a full-term normal delivery. Apart from facial anomalies, all other systems were normal.

Fig. 2 — Post-operative picture.

A CAT scan did not reveal intracranial extensions of the deformities. The right nasal bone was deformed and depressed. The right maxillary antrum was pneumatized. The cerebral hemispheres were normal.

We planned to repair the cleft lip and alveolus first so that the reconstructed nose could be positioned correctly. Although the proboscis was situated

very high on the nose, it had such a well-formed soft tissue on the right side of the nose that an attempt was made to bring it down to the level of the other normal nostril and thus reconstruct the nose. This was performed six months after the lip repair. It was achieved by freeing the entire proboscis from its attachment on the medial canthus by means of an elliptical incision leaving its vascularity intact on the subcutaneous pedicle. This pedicle was attached at the planned position on the base of the right alae (Fig. 2).

The defect on the root of the nose after removing the proboscis was closed directly. Since the proboscis was then attached via a subcutaneous pedicle only to the place where we wanted to place it, is was possible to bring it down and stitch it in the desired position at the level of the contralateral nostril after folding the subcutaneous pedicle. Three months later, the reconstructed nostril was connected to the main nasal cavity by opening the blind sac of the lining mucosa of proboscis. At the same time, correction of the defect of the left alae and cheek was performed by advancement of the left cheek. The medial wall of the proboscis was used to reconstruct the columella (Fig. 3).

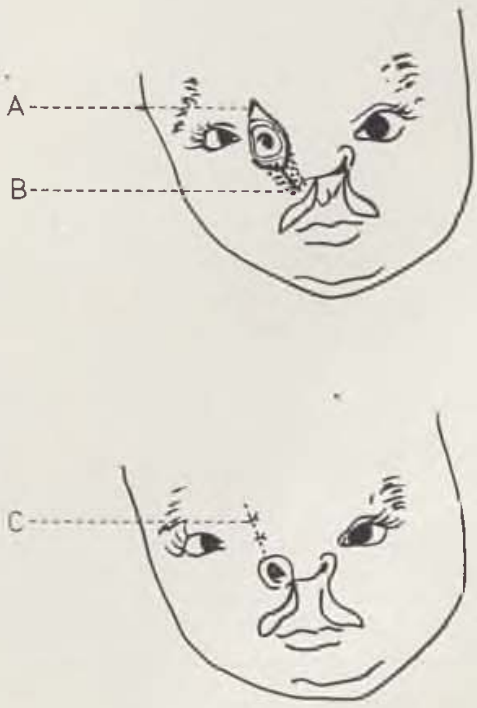

Fig. 3 — Drawing showing: (A) eliptical incision, (B) subcutaneous pedicle, (C) incision directly closed.

DISCUSSION

Clinical descriptions of the proboscis lateralis are well documented but there are not many reports on the methods of its reconstruction.

At one time not only was the lateral proboscis extirpated but also the eye was removed to avoid fistula formation leading to meningeal infection without interrupting its cranial communications.

A well-formed proboscis is a well-formed part of the nose and there is no reason to remove it. It is, no doubt, placed in an abnormal position but this well-formed part is much better than when reconstructed from the forehead or upper arm. It is a natural tube pedicle with good colour and texture to match which is in close proximity and with plenty of blood supply.

Attempts were made in the past to split the proboscis along its entire length being then attached to the side of the alae. Its main drawback is shortage of lining. It was decorticated and then buried under a flap. This results in a stenosis.

In our case we believe we are justified to utilize the only well-preserved part on the nose — the proboscis on the face. It was transferred down to a subcutaneous pedicle at the first stage and at the second stage, its medial part was used to reconstruct the columella.

A 14-year follow-up and experience of Boo Chai also suggest that it is reasonably safe to begin reconstruction of the hemi-nose in infancy since the proboscis grows simultaneously with the normal side and with the rest of the face.

SUMMARY

Proboscis lateralis of type IV has not yet been reported from the Indian subcontinent. The authors gives a report on a case of this type and describes the technique of reconstruction not described before.

A case of a right-sided proboscis lateralis associated with ipsilateral hemi--nasal aplasia and contralateral nostril and alar defect, a contralateral cleft lip and alveolus, hypertelorism and mild hydrocephalus is presented and documented on a boy coming from the Indian subcontinent.

RÉSUMÉ

Le Proboscis lateralis — type IV — rapport de subcontinent de l'Inde

Govila, A.

Il n'y eut pas de rapports de l'existence du proboscis lateralis du 4ème type sur le subcontinent de l'Inde. Nous décrivons un de ces cas et également la technique de reconstruction qui n'était pas encore décrite. Sur le subcontinent de l'Inde, on a découvert un cas du Proboscis lateralis droite, accompagné de l'aplasie droite de l'hémi-nez, du défaut de la fosse et de la paroi nasales du côté opposé, avec encore la fente labiale et l'alvéole du côté gauche, l'hypertélorisme et l'hydrocéphalus d'un certain degré.

ZUSAMMENFASSUNG

Proboscis lateralis des IV. Typs — Meldung aus dem indischen Subkontinent

Govila, A.

Über die Proboscis lateralis des IV. Typs gab es keine Berichte aus dem indischen Subkontinent. Wir beschreiben einen solchen Fall sowie die Technik der Rekonstruktion, die bischer nicht beschrieben wurde. Aus dem indischen Subkontinent wird ein Fall

rechtsseitiger Proboscis lateralis aufgefangen, der mit rechtsseitiger Aplasie einer Hälfte der Nase verbunden war sowie mit einem Defekt des Nasenlochs und des Nasenflügels auf den gegenüberliegenden Seite und mit einer Spaltung der Lippe und einem Alveolus auf der linken Seite, einem Hypertelorismus und einem gewissen Grad eines Hydrozephalus.

RESUMEN

Proboscis lateralis del tipo IV — la communicatión desde del subcontinente indio

Govila, A.

Hasta ahora ningún autor del subcontinente indio ha presentado un informe acerca de proboscis lateralis del tipo IV. El autor describe un tal caso en su comunicación. La técnica de reconstrucción que fué empleada en este caso está presentada por la primera vez. En la conclusión el autor describe los resultados satisfactorios obtenidos en base de ésta técnica.

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PRIMARY RECONSTRUCTIVE SURGICAL TREATMENT OF PATIENTS WITH CANCER OF THE MUCOUS MEMBRANE OF THE FLOOR OF THE ORAL CAVITY

G. I. STADIN

Surgical treatment of patients with localized cancer of the floor of the oral cavity appears to be most promising. When used both as an independent method and in combination with other means, it can prolong the 5-year survival by 40—50 % (1, 2). In the last few years, active investigations have been under way to improve the methods and principles of surgical removal of primary tumours of the mucous membrane of the oral cavity (1). The studies are concerned with the size of the tissues chosen to be removed depending on the spread of the malignant process in the vessels (1) and muscles (2). Such operations do not always let us observe the principles of radicalness (removal of the tumour 2—3 cm off its edge) since the affected muscles are localized in immediate anatomical closeness to the mandibular body and/or attached to it. In addition, this type of operations requires plastic surgery on postoperative defects using flaps on nutrient vascular pedicles. Other investigators (1) include into the mass of removed tissues a segment of the lower jaw thus breaking its integrity in order to achieve greater radicalness of surgical operations. Such operations result in gross impairment of the topographo-anatomical relationships of the lower portions of the mandibulofacial region. In the early postoperative period, this leads to disturbances of the respiratory and nutritional functions. In our opinion, surgical removal of the lower jaw with impairment of its continuity is therefore not justified. Guillamondequi and Jesse proposed a safe operation for the removal of malignant tumours in the anterior portion of the floor of the oral cavity preserving the continuity of the lower jaw. We also believe that safe, primarily-reconstructive, operations should be carried out invariably in all cases of treatment of patients with cancer of the mandibulofacial region (not, however, at the expense of radicalness).

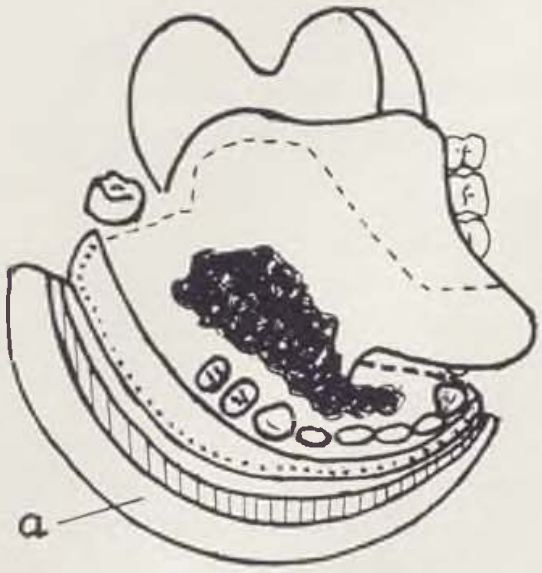
With the purpose of preserving the functional and aesthetic capacities of the mandibulofacial region and the radicalness of surgical operation, we propose to resect only that part of the lower jaw and the alveolar process to

which the muscles and the mucous membrane of the floor of the oralcavity to be removed are attached.

On the basis of this principle, we developed a method of primarily-reconstructive surgical treatment of patients with cancer of the mucous membrane of the frontolateral portions of the floor of the mouth (T3 — primary tumour, size 4 cm and more)[1].

METHOD OF OPERATION

After capsular-fascial removal of the connective tissue of the neck, the internal cortical plate of the lower jaw is dissected by means of a bur below the insertion of the mandibulosublingual, submandibulosublingual and mandibulolingual muscles. The latter are separated from the hyoid bone by means of an electric knife, but in case of total affection of the muscles, the hyoid bone is resected, too. Then the external wound is sutured. In the oral cavity, a trapeziform mucosoperiosteal flap, the width of the resected portion of the lower jaw, is excised and separated from the side of the vestibule and the cheek along the gingival margin (Fig. 1). Subsequently, the outer cortical plate below the alveolar process is dissected. The resection of the part of the lower jaw is completed by means of a chisel while the continuity of the jaw is preserved. In this manner, the part of the mandible below the alveolar process in the lateral section and also the internal cortical plate in the frontal section are included in the mass of the tissues to be removed (Fig. 2).



(Fig. 1. Mass of excised tissues of the floor of the oral cavity and the tongue. Separated mucosoperiosteal flap

[1] Method of surgical treatment of cancer of the lateral parts of the floor of the oral cavity. Author's report No. 1290577 of 15. 10. 86 — USSR.

Thereupon, electroexcision of the tumour is carried out within the healthy tissues with part of the tongue, its root, the floor of the oral cavity and the muscles forming them. The mass of the tissues is removed.

Plastic operation on the postoperative defect is carried out by means of a mucoso-musculoperiosteal flap excised (see above) from the side of the vestibule and the cheek. At the base of the flap, the periosteum and the buccal muscle are incised preliminarily to improve its mobility. The flap freely covers the defect of the lower jaw and the soft tissues of the floor of the oral cavity. The flap is nourished through the mandibular and the transverse arteries. Catgut sutures are applied to the flap and the remaining part of the tongue (Fig. 3). A iodoform-impregnated pad is placed above the sutures. A clinical observation is presented as follows.

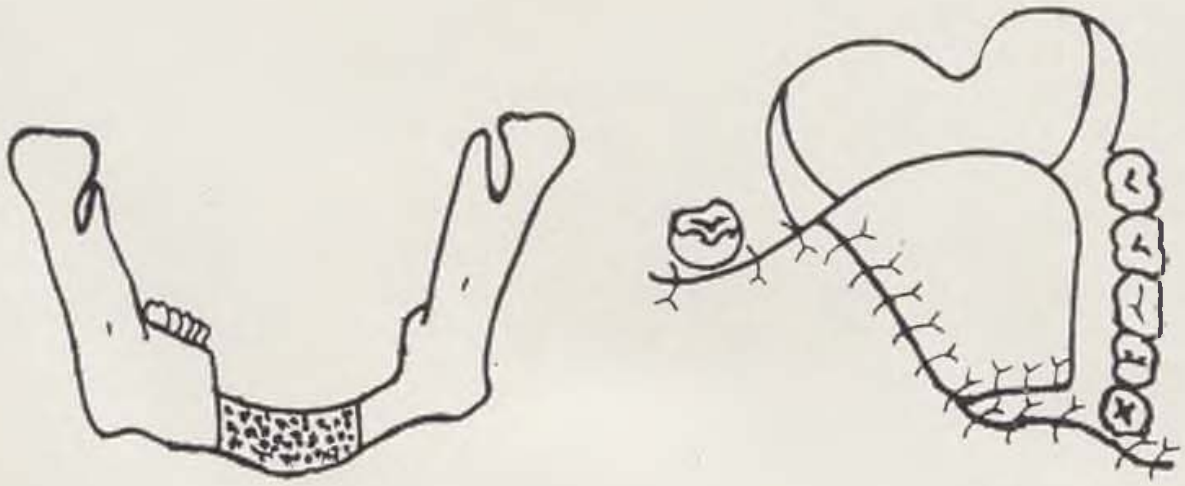


Fig. 2. Sketch of resection of mandibular body (posterior view) — Fig. 3. State after plastic operation on postoperative defect

Patient D., aged 47, was admitted to the department of the Research Institute of Oncology with the diagnosis: cancer of the mucous membrane of the frontolateral sections of the floor of the oral cavity on the right, T3NOMO. No metastases were found in the lymph nodes of the regional zone. In the frontolateral portions of the floor of the oral cavity on the right, there was a tumour 4.5 × 2.5 cm of the infiltrative scarforming type of growth. Histology revealed flat-cell cancer, medium degree differentiation.

Under endotracheal anaesthesia with intubation through the nose the tumour was removed (following the method described above) with resection of the lower jaw in the region of $\overline{6|3}$ teeth. The postoperative course was smooth, healing by first intention. Tracheostomy was not performed. The natural way of feeding was used; the patient obtained liquid diet on the first day after operation. The iodoform-impregnated pad and the stitches in the region of operation were removed after 7 days. No relapse of tumour was found on examinations of the patient 6 months, one and 2 years post-

operatively. The respiratory and nutritional functions were fully preserved. There is no disfigurement of the lower parts of the mandibulofacial region (Figs. 4—6).

Surgical treatment using the proposed method is indicated in locally situated cancer of the mucous membrane of the floor of the frontolateral portions of the mouth (primary tumour T2-3), cancer of the lateral portions of the mucous membrane of the tongue extending to the floor of the oral cavity (primary tumour T2-3).

Fig. 4. Patient D. State after operation. Anterior view.

The proposed method is contraindicated when the tumour involves the body of the lower jaw and preoperative radiation therapy reached a dose higher than 40 G.

The described method of surgery was used in 115 patients with cancer of the mucous membrane of the floor of the mouth and in 34 patients with cancer of the tongue extending to the floor of the oral cavity with primary tumour T3 (4 cm and more). Control examination of the patients took place after 3 and 6 months, one and 2 years, and later. Relapses of the tumour were found in 43 patients (28.9%), essentially in the course of a year (75 %). We obtained similar results of treatment of the mentioned disease when more traumatic methods of operation were used.

Tracheostomy and feeding of the patients through a nasoesophageal tube or parenterally are indispensable in traumatic operations (2, 3). According to our data, temporary tracheostomy was performed after operation in only one of the 149 patients because of expressed edema of the oropharyngeal tissues. Natural ways of nutrition with liquid diet were used on the day following operation. Tubal or parenteral nutrition was used in 7 patients as the act of swallowing was disturbed during the first 24 h after operation. Subsequent observation of the patients showed that the natural functions of breathing and feeding were preserved in all of them.

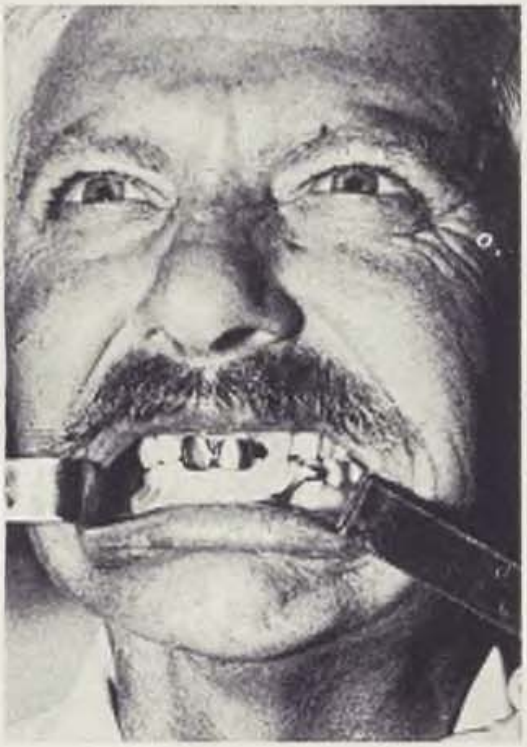


Fig. 5. The same patient. Gentle postoperative scar can be seen. — Fig. 6. The same patient seen after application of proshesis

Surgical treatment of patients with cancer of the mucous membrane of the oral cavity is frequently (in 50—60 % of cases) accompanied by suppurative-necrotic complications (2,4). By means of the primarily reconstructive method of surgical treatment it is possible to reduce their frequency by 24.4 %. Postoperative disfigurement of the lower portions of the mandibulofacial region has never been found in the patients under observation. About 70 % of the patients with relapse-free course are back to work and, quite frequently, in their own profession.

The proposed method of primarily reconstructive surgical treatment of patients with cancer of the mucous membrane of the floor of the mouth

and the tongue does not diminish radicalness of the operation, reduces the number of suppurative complications, preserves the natural ways of respiration and nutrition from the early postoperative period, does not lead to gross cosmetic disturbances and has a positive effect on the patients' rehabilitation in social life and work.

Positive results of surgical treatment of the patients permit us to recommend broad application of the proposed method in practical health care.

SUMMARY

A new method of primarily reconstructive surgical treatment of patients with cancer of the mucous membrane of the floor of the oral cavity is described. By means of this method it is possible to preserve the natural ways of breathing and nutrition from the early postoperative period without neglecting the principles of radical treatment and considerably to reduce the number of postoperative complications. The proposed method of operation does not lead to disfigurement of the lower portions of the mandibulofacial region.

Key words: oral cavity; cancer; surgical treatment

RÉSUMÉ

Traitement chirurgical reconstructif de premier temps des malades avec un cancer des muqueuses de la base de la cavité orale

Stadin, G. I.

Donnée la description du traitement chirurgical reconstructif primaire des malades atteints du cancer de la base de la cavité orale. La méthode favorise la conservation des voies respiratoires et d'alimentation naturelles, dès la période postopératoire précoce (sans interrompre les principes d'un traitement radical), et elle diminue considérablement le nombre de complications postopératoires. La méthode proposée ne mène pas aux déformations des parties inférieures de la région mandibulofaciale.

ZUSAMMENFASSUNG

Primär-rekonstruktive chirurgische Behandlung von Patienten mit Krebs der Schleimhaut der unteren Mundhöhle

Stadin, G. I.

Es wird die Methode der primär-rekonstruktiven chirurgischen Behandlung von Patienten mit Krebs der Schleimhaut der unteren Mundhöhle beschrieben. Diese Methode gestattet es, die natürlichen Atmungs- und Ernährungswege ab der frühzeitigen Periode nach der Operation (ohne eine Störung der Grundsätze einer radikalen Behandlung) beizubehalten und verringert erheblich die Anzahl der Komplikationen nach der Operation. Die vorgeschlagene Methode der Operation führt zu keiner Deformierung der unteren Teile der mandibulofacialen Region.

SUMARIO

El tratamiento quirúrgico primario-reconstructivo de los pacientes con el cáncer de la mucosa en la base de la cavidad bucal

Stadin, G. I.

El papel describe el método primario-reconstructivo del tratamiento quirúrgico uasdo en los pacientes con el cáncer de la mucosa en la base de la cavidad bucal. Este método facilita mantener las vías naturales del paso del aire y la posibilidad de alimentación ya desde el período temprano postoperativo y considerablemente disminuye el número de las complicaciones postoperativas. La técnica quirúrgica propuesta elimina las deformaciones de las partes inferiores de la zona mandibulofacial.

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DIFFERENCES BETWEEN FACIAL CONFIGURATION AND DEVELOPMENT IN COMPLETE AND INCOMPLETE UNILATERAL CLEFT LIP AND PALATE DURING THE PREPUBERTAL PERIOD

Z. ŠMAHEL, Ž. MÜLLEROVÁ, B. ŠKVAŘILOVÁ, M. HAVLOVÁ

In one of our previous studies were described the differences between cranial configuration in complete and incomplete unilateral cleft lip and palate in adults (Šmahel and Brejcha, 1983). Incomplete clefts were not associated with reduced upper face height, enlarged nasal cavity, or decreased upper lip thickness and the shortening of maxillary depth was significantly smaller than in complete clefts. The other main skeletal deviations, i.e. dento-alveolar retroinclination and the posterior displacement of the maxilla, widening of the interorbital space and shortening of mandibular body and ramus acompanied by changes in the shape of the lower jaw, were not related to the severity of the cleft. The described differences, especially of maxillary depth, resulted in deviations of related parameters, as e. g. flattening of the facial profile, impairment of sagittal jaw relations and of occlusion, degree of retrocheilia a. s., which all of them were regularly more marked in complete clefts. The aim of the present study was to determine whether the above mentioned differences between the involvement of facial bony framework in both types of clefts in adults occurred equally in the period of mixed dentition prior to the onset of the pubertal growth spurt which is associated frequently with a deterioration of the development of the jaws and of occlusion.

MATERIAL AND METHODS

Into the present series were assigned boys with incomplete unilateral cleft lip and palate without any associated malformations. The probands

were aged 8, 10 a 12 years. In each category approximately one half of the individuals examined had a soft bridge at the lower margin of the nostril and another half had both a soft and a bony bridge over the alveolar cleft. The patients were examined according to their birth date, mostly plus or minus one month. Primary lip suture was carried out according to Veau or Tennison at about the 7th month of life without bone grafting or periosteal flap surgery. The repair of the palate was performed mostly at 4—5 years of age with a pushback and pharyngeal flap surgery. Orthodontic treatment consisted exclusively of the use of removable appliances without preoperative jaw orthopedics. All individuals within the youngest age group had erupted permanent middle upper and lower incisors.

The numbers of individuals examined are presented in table 1. The mixed-longitudinal data between 8—10 years are supplemented by a longitudinal follow-up during the period of 10—12 years. Seventeen patients (i. e. 2/3) were examined twice at the age of 8 and 10 years. In the second age group 18 patients were examined again at the age of 12 years and the results obtained are presented separately in table 1 and in figures.

The results were compared with the mixed-longitudinal data in the series of boys with a complete unilateral cleft lip and palate. These individuals

Tab. 1. Mean values of X-ray cephalometric characteristics in individuals with complete ($UCLP_c$) and incomplete ($UCLP_i$) unilateral cleft lip and palate

	$UCLP_i$				$UCLP_c$		
Years	8	10	10_{lg}	12_{lg}	8	10	12
N-S-Ba	134,9	134,7	136,0*	135,4*	134,0	132,6	131,0
Prn-Sn	14,9*	15,7**	16,1**	16,2	13,8	14,5	15,8
ML/NSL	39,8	38,9	40,3	40,0	39,2	40,0	38,7
S-Go%N-Gn	59,3	60,4	59,8	60,2	59,8	59,2	61,0
ANB	3,3	1,9	2,2	1,7	2,9	1,7	1,3
N-Ss-Pg	174,6	177,8	177,7	179,3	177,2	177,9	180,5
ISL/PL	75,6	82,4	83,3	85,5	76,2	79,2	81,7
Is-Ii	−1,0	1,0	0,7	0,7	−1,3	−0,7	1,2
N′-Sn-Pg′	169,0	169,8	169,7	169,9	169,6	169,2	169,4
Ss′-N′-Sm′	5,6	5,1	5,5	5,1	4,4	5,5	5,0
Ls + Li	1,7	2,1	2,2	2,0	1,5	1,0	1,6
Sn-Ls	12,6	12,6	12,2	11,9	11,8	12,4	12,7
n	28	26	18	18	28	30	26

*significant differences between $UCLP_i$ and $UCLP_c$ at $p<0,05$ (**$p<0,01$)
lg = longitudinal part of the study

Appendix: The other measured nonsignificant characteristics were: N-S. S-Ba. N-Rhi. Sp-Is. Ii-Gn. Sp-Pg. Ss-Pmp. S-Go. S-Pgn. Cd-Go. Pgn-Go. Pmp-NSL. Ptm-VL. N-S-Pgn. S-N-Rhi. S-N-Ss. S-N-Pr. S-N-Id. S-N-Sm. S-N-Pg. PL/NSL. ML/RL. CL/ML. RL/NSL. ASL/PL. IIL/ML. PL/ML. Prn-Sp. Sn-Sto. Ls-Li. S-N′-Ss′. S-N-′Sm′. S-N′-Pg′. N′-Prn-Pg′. Ss_t′. Pr_t. Mo-Mo. Lo-Lo,

were treated during the same period of time with the same methods and were assigned into our study under the same conditions as patients with incomplete clefts. The data were described in more detail in our previous study (Šmahel et al., in press). Figure 2 shows growth curves supplemented by findings obtained in adults with complete and incomplete clefts (Šmahel and Brejcha, 1983).

X-ray films were obtained under standard conditions during centric occlusion. Craniometric points and reference lines used for the assessment of lateral X-ray films are presented on figure 1. The perpendicular distance of a given point from the reference line is marked e. g. as Pmp-VL, the angles Ss-N-Sm (i. e. ANB), or as a fraction of pertinent reference lines (ML/NSL) and proportional characteristics S-Go%N-Gn (S-Go in percent of N-Gn). Maxillary overjet (Is-Ii) was measured between the edges of the upper and

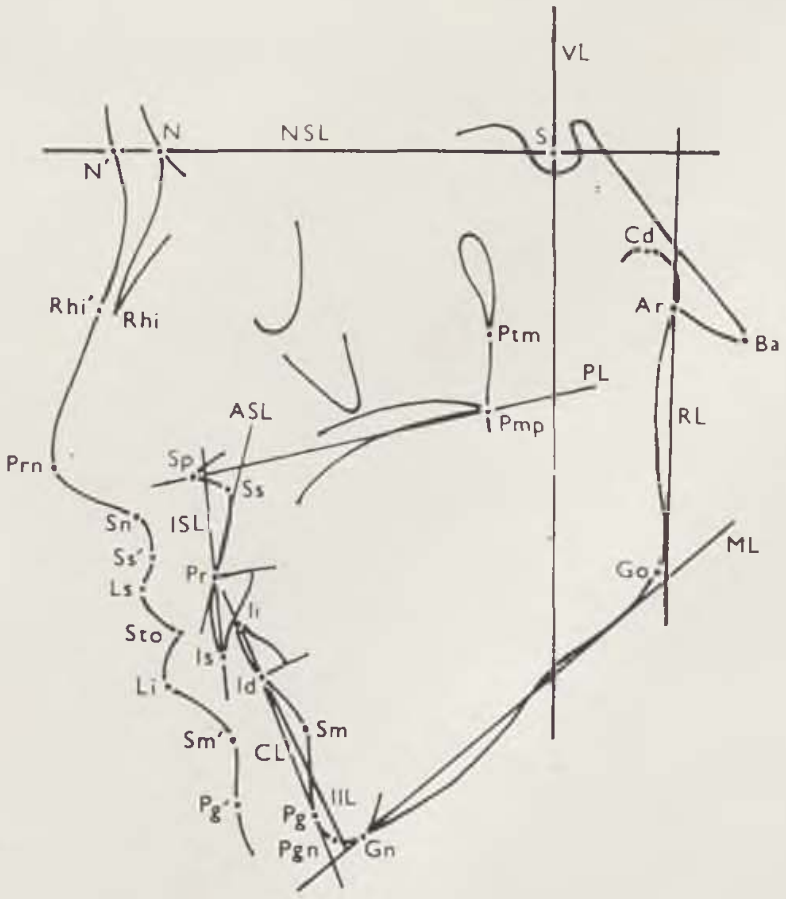

Fig. 1. Cephalometric points and reference lines used in the present study: NSL = line through N and S, VL = perpendicular to NSL through S, PL = line through Sp and most posterior point of the palatal processes, ML = tangent to the mandibular body through Gn, RL = tangent to the mandibular ramus through Ar, CL = line through Id and Pg, ASL = tangent to the upper alveolar process through Pr, ISL = line through Is and Pr, IIL = line through Ii and Id (cephalometric points see e. g. Šmahel, 1984).

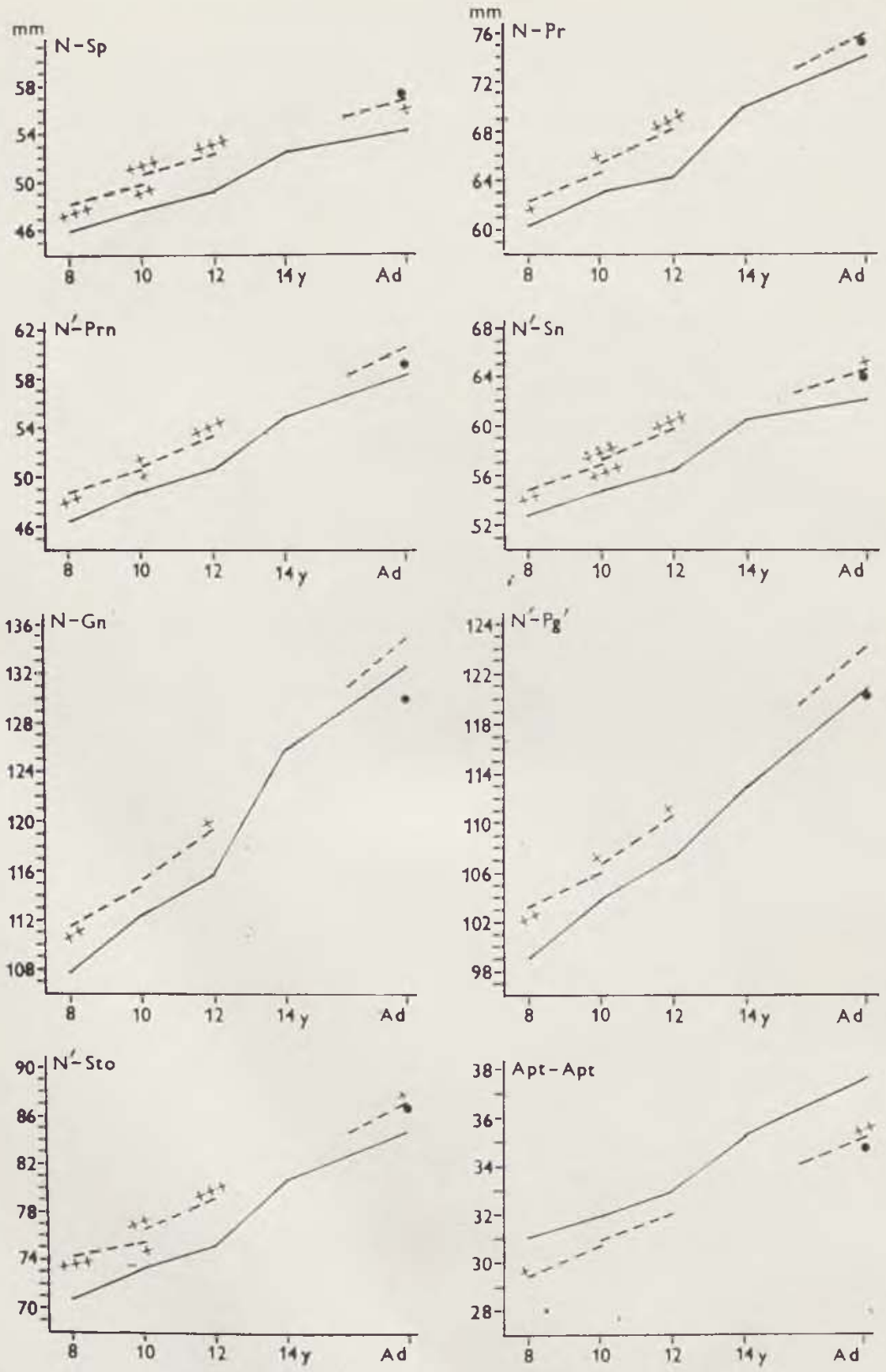

Fig. 2. Growth curves of some facial variables in individuals with incomplete (dashed line) and complete (full line) unilateral cleft lip and palate (*significant difference between complete and incomplete clefts at $p < 0.05$, **$p < 0.01$, ***$p < 0.001$; y = years; Ad = adults; black points = controls).

lower incisors parallel to the occlusion plane; Ls+Li illustrates the degree of anterior prominence of the upper lip over the lower lip (measured at the above mentioned points perpendicular to the connecting line N′-Pg′). The thickness of the upper lip was measured from point Ss′ and Pr parallel to the palate plane (marked Ss'_t and Pr_t). In the case of double contours, due to differences between the right and left side, the pertinent points were marked at the midpoint between both contours. Because of the aim of our study anteroposterior films were used only for the determination of the interocular distance (Mo-Mo), the distance between the outer orbital margins (Lo-Lo) and of the width of the nasal cavity (Apt-Apt).

The data obtained by measurements were analysed with routinely used statistical methods and the results were compared with the t-test with those recorded in complete clefts. The t-test was used in the second age group as a whole (n=26) as well as in a smaller number of children followed-up longitudinally (n=18). Thus each investigated parameter was tested with four t-tests in all three age groups. If only one of them attained the significance level the result was not considered of particular importance. Characteristics with two or more significant differences are presented in table 1 or on figure 2. From dimensions which failed to attain significant differences are documented only some clinically important parameters. The other investigated characteristics are recorded in the Appendix of table 1.

RESULTS

As compared to incomplete clefts, individuals with complete clefts showed throughout the whole period of studies a significant reduction of upper face height (N-Sp, N-Pr, Fig. 2) which was associated with a significant reduction of nasal length (N′-Prn) and height (N′-Sn) and of the physiognomic height of the upper face (N′-Sto). The difference was reflected equally by the total facial height (N′-Gn, N′-Pg′). There were no differences between the depth of the maxilla (Ss-Pmp) in these two types of clefts. The width of the nasal cavity (Apt-Apt) was larger in complete clefts than in incomplete clefts. The difference attained the significance level in the youngest age group, in the other groups it was at the level of $p<0.1$ and persisted up to adult age (Fig. 2). The longitudinally studied series of 18 patients with incomplete clefts had a more obtuse angle of the cranial base, however the series as a whole did not differ from complete clefts (N-S-Ba, Tab. 1). The thickness of the upper lip (Ss'_t, Pr_t) was not related to the severity of the cleft, while nasal depth (Prn-Sn) was larger in incomplete clefts as compared to complete clefts, but for the last age group (Tab. 1).

Of the other studied parameters (Tab. 1; Appendix) no differences between complete and incomplete clefts showed several fundamental characteristics as dentoalveolar retroinclination (ASL/PL) and retroposition (Ptm-VL) of the maxilla, interocular distance (Mo-Mo), size of the mandible (Pgn-Go, Cd-Go), posterior height of the upper face (Pmp-NSL), upper lip height (Sn-Ls, Sn-Sto) and some related characteristics as the retrusion of

the upper jaw (S-N-Ss), characteristics of the shape and position of the lower jaw (ML/RL, CL/ML, RL/NSL, S-N-Pg) and the configuration of the facial soft profile (S-N′-Ss′, S-N′-Pg′, N′-Prn-Pg′). The growth rotation (ML/NSL, S-Go%N-Gn) and the flattening of the skeletal (N-Ss-Pg) and soft tissue (N′-Sn-Pg′, Ss′-N′-Sm′) facial profile were identical in both types of clefts as w ll (Tab. 1). In incomplete clefts were slightly better sagittal jaw relations (ANB) and from the age of 10 years also the proclination of upper incisors (ISL/PL) and the prominence of the upper lip (Ls+Li). This was most probably the reason why a positive overjet was restored in incomplete clefts at the age of 10 years, while in complete clefts only at the age of 12 years. At the age of 10 years the difference of occlusion of incisors attained almost the significance level ($p<0.1$).

DISCUSSION

Two of the three principal skeletal parameters which differ in adults with complete unilateral cleft lip and palate from those with incomplete clefts (Šmahel and Brejcha, 1983) showed distinct differences as early as at the age between 8 and 12 years. In complete clefts was present a smaller upper face height and a larger width of the nasal cavity. These findings indicated that the deficient vertical growth of the upper face in complete clefts represented an early, most probably prenatal developmental anomaly. Nordin et al. (1983) confirmed that the limitation of the vertical growth of the upper face occurred prior to the age of 7 years, which was the age from which they followed the growth of the face. It was suggested that it could be due to the impaired interaction of the upper jaw with the nasal septum. It is believed that the latter plays an essential role in facial growth (Scott, 1967). In incomplete clefts the interaction with the affected maxilla is not completely interrupted and this could represent the cause why this deviation did not develop. However, from the above mentioned it does not follow that the deficient vertical growth of the upper face is not related to the applied surgical treatment. It is even more marked after the early implantation of bone grafts (Ross, 1987; Šmahel and Müllerová, 1988). The second deviation consisting of a wider nasal cavity in complete clefts, beyond any doubt, represents a sequela of the original cleavage of maxillary segments because of interrupted continuity of the jaw.

Prior to palate surgery, even in complete clefts, the depth of the maxilla shows no substantial changes (Šmahel and Müllerová, 1986). A shortening occurs gradually after palatoplasty. Up to the onset of puberty we failed to demonstrate a difference between complete and incomplete clefts which was observed in adults (Šmahel and Brejcha, 1983). It developed most probably, only during the pubertal growth spurt. The difference could be due to the lower resistance of a completely cleft jaw to the action of postoperative adverse factors. The thickness of the upper lip which is smaller in adults with complete clefts (Šmahel and Brejcha, 1983) did not differ during the prepubertal period from its thickness in incomplete clefts.

Since we failed to disclose in our series any differences between the depth of the maxilla in complete and incomplete clefts both investigated types of clefts equally did not differ during the prepubertal period in their related characteristics as e. g. in the retrusion of the maxilla, sagittal jaw relations, convexity of the facial profile, overjet and prominence of the upper lip. In adults all these characteristics were more markedly impaired in complete as compared to incomplete clefts (Šmahel and Brejcha, 1983). Only slightly more favourable sagittal jaw relations and from the age of 10 years also a somewhat more marked proclination of upper incisors and better prominence of the upper lip in incomplete clefts reflected the beginning difference between the two studied types of clefts. They could be also of clinical importance because of the possibility of an earlier restoration of a positive overjet and better perspectives of its maintenance in incomplete clefts. However, generally the results showed that the differences between facial configuration in complete and incomplete cleft lip and palate were much smaller prior to the onset of puberty than in adult age.

Out of those characteristics which in adults were not related to the severity of the cleft during childhood a difference was disclosed only in values of nasal depth. It was smaller in complete clefts. The difference was due to the more marked flattening and deformation of the nose in this type of cleft. In adults because of corrective surgery the difference was no more present. A flattening of the cranial base observed in a small group (n=18) of longitudinally followed patients with incomplete clefts was considered as due to an accidental composition of our series. In the series as a whole as well as in adult age (Šmahel and Brejcha, 1983) it did not occur and was not considered as typical for clefts (Šmahel, 1984).

The growth and development of all studied parameters proceeded similarly in complete and incomplete clefts. Differences between mean values of individual characteristics were present either in all age groups (Fig. 2) or were not significant. The sagittal jaw relations (ANB) steadily deteriorated both in complete and in incomplete clefts (Tab. 1) and the angle of facial skeletal convexity (N-Ss-Pg) at the age of about 12 years changed into a concave angle. The steep slope of mandibular body (ML/NSL), similarly as the vertical jaw relations (PL/ML) and the gonial angle (ML/RL) did not change with age, while they decrease in normal individuals. The anterior rotation of the face was markedly reduced, the pertinent index values (S--Go%N-Gn) declined to the lower margin of the neutral growth zone (59—61 %). It was possible to improve a proclination of upper incisors (ISL/PL) and overjet (Is-Ii) and therefore the prominence of the upper lip did not deteriorate during the period of our study (Ls+Li). The convexity of the soft facial profile showed equally no changes (N'-Sn-Pg') but the values were markedly below the average as compared to the norm. The upper lip did not grow in vertical direction, up to the age of 12 years mean values of its cutaneous part (Sn-Ls) were definitely lower than the norm for children

aged 5 years. These developmental changes in complete clefts were described in more detail in our previous report (Šmahel et al., in press).

We failed to disclose in the literature available any paper aimed at studies of differences between craniofacial morphology in complete and incomplete unilateral cleft lip and palate in childhood. With the use of direct cephalometry we have demonstrated a smaller upper face height in complete clefts as compared to incomplete clefts as early as prior to lip surgery at the age of 7 months (Šmahel et al., 1985). This observation was suggestive of a prenatal origin of this change. Further recorded changes included a widening and deviation of the nose which was more marked in complete clefts. However, direct cephalometry did not allow to study dimensions which were not situated on the surface. Therefore, comparable data are not available.

SUMMARY

Mixed-longitudinal roentgencephalometric data were used for the determination of differences between the configuration and development of the face in complete and incomplete unilateral cleft lip and palate at the age of 8 to 12 years. As compared to incomplete clefts patients with complete clefts had a reduced height of the upper face and thus also of the face as a whole and an increased width of the nasal cavity. These findings were in agreement with the situation in adults, but contrary to adults we failed to disclose any difference in the depth of the maxilla and thus there were also no differences of the retrusion of the upper jaw, sagittal jaw relations, facial convexity, occlusion of incisors and the prominence of the upper lip. The thickness of the upper lip did not differ as well. The global results showed that the differences between facial configuration in these two types of clefts were much smaller up to the onset of puberty than in adults. Throughout the investigated period of time the growth and development of the investigated parameters proceeded identically in both forms of clefts. The reduction of upper face height in complete clefts confirmed an early, probably prenatal origin of this deviation from normal.

RÉSUMÉ

Différence en formation et évolution du visage chez les fentes labiopalatines totales et incomplètes dans la période prépubère

Šmahel, Z., Müllerová, Ž., Škvařilová, B., Havlová, M.

Sur les bases des données radiocéphalométriques semilongitudinales, on a suivi les différences de la formation et de l'évolution du splanchnocranium entre les fentes labiopalatines totales et incomplètes à l'âge de 8 à 12 ans. Chez les fentes totales, à l'oppcsition aux fentes incomplètes, la hauteur du visage supérieur — et par conséquence la hauteur de tout le visage — était diminuée et la largeur de la cavité nasale était augmentée. Ces observations correspondent à la situation à l'âge adulte mais on n'a remarqué aucune différence en profondeur du maxillaire supérieur, et non plus en rétrcussion du maxillaire supérieur, en rapports intéromaxillaires sagittaux, en convexité du

visage et — comme conséquence d'autres coïncidences — il n'y avait non plus de différence en occlusion et en proéminance de la lèvre supérieure. Aucune différence aussi en épaisseur de la lèvre supérieure. Généralement, les résultats témoignent que les différences de formation du visage entre les deux degrés de fente sont considérablement moins marquantes avant l'arrivée de la puberté qu'à l'âge adulte. La croissance et l'évolution des paramètres suivis se développaient d'une façon identique chez les deux types de fente pendant toute la période d'expérimentation. La diminution de la hauteur du visage supérieur chez les fentes totales fait preuve d' origine précoce, même prénatale, de cette anomalie.

ZUSAMMENFASSUNG

Unterschiede in der Gesichtsgestaltung und Entwicklung zwischen totalen und subtotalen einseitigen Lippen- und Gaumenspalten im Kindesalter

Šmahel, Z., Müllerová, Ž., Škvařilová, B., Havlová, M.

Anhand der semilongitudinalen röntgenzephalometrischen Angaben erfolgten Bestimmungen der Unterschiede zwischen der Gestaltung und Entwicklung des Gesichtes bei totalen und bei subtotalen einseitigen Lippen- und Gaumenspalten im Alter von 8 bis 12 Jahren. Gegenüber den subtotalen Spaltmissbildungen bestand bei der totalen Form eine Herabsetzung der Höhe des Obergesichtes, und dadurch auch der Gesamthöhe des Gesichtes und eine grössere Nasenhöhlenbreite. Diese Befunde waren im Einklang mit der Situation bei Erwachsenen. Demgegenüber bestanden keine Unterschiede in der Tiefe des Oberkiefers, und daher auch nicht in der Retrusion des Oberkiefers, bzw. in den sagittalen gegenseitigen Beziehungen der Kiefer, der Konvexität des Gesichtes, oder in der Prominenz der Oberlippe. Es wurden ebenfalls keine Unterschiede in der Oberlippendicke verzeichnet. Global zeigten daher die Ergebnisse, dass die Unterschiede in der Gesichtsgestaltung zwischen den beiden Formen der Spaltmissbildungen bis zum Eintreten der Pubertät viel geringer ausgeprägt waren als bei Erwachsenen. Das Wachstum und die Entwicklung der verfolgten Parameter verliefen während der untersuchten Zeitperiode in ähnlicher Weise bei beiden Typen der Spaltmissbildungen. Die Herabsetzung der Höhe des Obergesichtes bei totalen Lippen- und Gaumenspalten bestätigte ihre frühzeitige Entstehung, vermutlich bereits in der vorgeburtlichen Periode.

SUMARIO

Las diferencias en la formacion y el desarrollo de la cara entre la fisura unilateral completa y incompleta del labio y paladar durante la edad prepubertal

Šmahel, Z., Müllerová, Ž., Škvařilová, B., Havlová, M.

A base de los datos roentgeno-cefálicos semilongitudinales, los autores estudiaron las diferencias en la formación y el desarrollo del esplacnocráneo entre las fisuras unilaterales completas y incompletas del labio y paladar en los enfermos desde 12 años. En comparación con las fisuras in completas, las hendiduras completas los pacientes tuvieron la altura de la parte facial superior reducida, es decir toda la cara fué disminuída, y la anchura del seno nasal aumentada. Estos hallazgos corresponden a la situación en la edad madura, pero los autores no hallaron ninguna diferencia en la profundidad del maxilar y tampoco en la retrusión del maxilar, en las relaciones sagilates intermaxilares, en la convexidad facial o en la oclusión y en la prominencia del labio

superior. Tampoco fue observada una diferencia en el espesor del labio superior. En general, los resultados muestran que las diferencias referentes a la formación de la cara entre los dos grados de la fisura en la edad prepubertal son mucho más pequeñas que en la edad madura. El crecimiento y el desarrollo de los parámetros investigados fueron durante la investigación idénticos en ambas formas de la fisurá. La disminución de la altura de la parte superior de la cara en caso de las fisuras completas confirma el orígen temprano, de este defecto probablemente ya existente en la edad prenatal.

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HYPODONTIA IN PATIENTS WITH ISOLATED CLEFT PALATE, ITS RELATIONSHIP TO ETIOPATHOGENESIS

O. JIROUTOVÁ

Patients with facial cleft usually have abnormalities in the number, shape, size and position of their teeth. Frequently, this also involves absence of teeth formation, hypodontia.

These abnormalities have been studied by many specialists, such as Ranta (1983, 1986) in Finland, Olin (1964), Iowa, the US., Weise and Erdmann (1967) in Germany, and Hellquist (1979) in Sweden.

The aim of our paper was to study the incidence of hypodontia in patients with isolated cleft palate in the Czech population. Further, we tried to find out whether there existed a correlation between the experimentally tested impairment seen in the early development of the mandible — a potential cause of isolated cleft palate — and a higher frequency of mandibular hypodontia, and we made an assessment between the degree of the cleft palate and the incidence of hypodontia.

MATERIAL AND METHODS

Our group included 200 patients with isolated cleft palate, 92 boys and 108 girls without associated malformations. They were selected randomly from the patients treated at the Laboratory of Congenital Development Defects, Institute of Experimental Medicine, Czechoslovak Academy of Sciences. Their age ranged from 11—14 years.

The patients were assessed in groups according to the degree of the cleft: 19 patients had complete cleft, 154 incomplete cleft and 27 had only soft palate clefts.

The X-ray pictures were used for the study. We evaluated orthopantograms of the upper and lower jaws and studied hypodontia in all groups of permanent teeth with the exception of third molars. The latter were not evaluated as they do not reliably determine the presence of the dental germs

in the children under study. The results of the examination were tested by the t-test to determine the difference between two relative values. The control data used for the healthy population were based on Marková's paper (1985).

RESULTS

In our group we found hypodontia in 51 children, i. e. 25.5 % (Table 1). The difference compared with the control group is highly significant (Table 4). There was no significant difference between the results obtained in boys (26.1 %) and girls (25.0 %) (Table 1). Hypodontia affected more frequently the lower jaw (18 %) than the upper jaw (10.5 %, $p<0.05$, Table 1). The highest frequency was observed in the second lower premolar (14.5 %) and the lateral upper incisor (10 %, Table 2). In 3 % of the probands the dental anomaly was seen to involve the teeth of more morphological groups.

Table 1. Incidence of hypodontia in isolated cleft palate

Hypodontia	n	Number	%
Total	200	51	25,5
Boys	92	24	26,1
Girls	108	27	25,0
Maxilla	200	21	10,5*)
Mandibula	200	36	18,0*)

*) significant difference in maxillary and mandibular impairment. $p<0,05$

Table 2. Hypodontia of individual teeth of the maxilla and mandible in patients with isolated cleft palate

Type of tooth	Maxilla		Mandible	
	number	%	number	%
Central incisor	1	0,5	3	1,5
Lateral incisor	20	10,0	4	2,0
Canine	0	0	1	0,5
First premolar	0	0	1	0,5
Second premolar	1	0,5	29	14,5
First molar	1	0,5	1	0,5
Second molar	1	0,5	2	1,0

Further, we evaluated the frequency of hypodontia in each type of cleft palate. The complete cleft palate (up to the for. incisivum) was associated with maxillary hypodontia in 21 % cases, and in lower jaw in 15.8 % (Table 3).

In cases of incomplete cleft palate, the upper jaw was affected in 11.2 % of patients, the lower jaw in 14.9 % (Table 3). In cases with soft palate cleft only, hypodontia of the upper jaw was found only in 1 patient (i. e. 3.7 %), in mandible hypodontia appeared in 37.0 % patients.

Table 3. Incidence of hypodontia in individual types of isolated cleft palate

Type of cleft	Total		Maxilla		Mandibula		Both maxilla and mandible	
	number	%	number	%	number	%	number	%
Complete cleft palate	5	26,3	4	21,0	3	15,8	2	10,5
Incomplete cleft palate	37	24,0	17	11,0	23	14,9	3	1,9
Soft cleft palate	10	37,0	1	3,7	10	37,0	1	3,7

Table 4. Incidence of hypodontia (in %) in patients with isolated cleft palate compared with the healthy population

	Cleft	Control	
Boys	26,1	5,9	$p<0,001$
Girls	25,0	7,1	$p<0,001$
Total	25,5	6,5	$p<0,001$

Table 5. Comparison of incidence of hypodontia (in %) in individual types of isolated cleft palate

	Total	Maxilla	Mandible
Complete vs. incomplete	26,3 vs. 24,0 NS*	21,0 vs. 11,0 NS*	15,8 vs. 14,9 NS*
Complete vs. soft palate	26,3 vs. 37,0 NS	21,0 vs. 3,7 $p<0,1$	15,8 vs. 37,0 NS
Incomplete vs. soft palate	24,0 vs. 37,0 NS	11,0 vs. 3,7** NS	14,9 vs. 37,0** $p<0,05$

*NS — non-significant
** — significant difference in maxillary and mandibular impairment was found only in cases with soft palate cleft ($t = 3,38$; $p<0,01$),

DISCUSSION

This study gives evidence of a higher frequency of hypodontia in patients with isolated cleft palate than in the healthy population; it also shows a different frequency of this anomaly in dependence on the extent of the cleft. The examination of our group showed the presence of hypodontia at a rate of 25.5 %. Ranta (1983) indicated the frequency of 31.5 % for the Finnish population.

We observed a more frequent incidence of hypodontia in the mandible (18 %) than in the maxilla (10.5 %). Failure of dental development was most frequently observed in the case of the second lower premolar (14.5 %) and the upper lateral incisor (10 %).

During embryogenesis, there are 3 distinctive critical stages which are decisive for the development of cleft lip or palate. The isolated cleft palate develops in the second or third critical stage (Jelínek et al., 1983). In the second stage (6th through 7th embryonal week), the cleft development is caused by the growth inhibition of the palate plate, which results in hypoplasia. During the 3rd critical stage (2nd half of the 8th week) the embryonal head extends and the mandibular anlage grows intensively. The mandibular growth is accompanied by a change in the tongue position, above which a space is being formed for the purpose of horizontalization of the palate plates. The role of the mandible in the horizontalization of the palate plates is stressed by many specialists. On the basis of Sicher's hypothesis from 1915, Hart with his colleagues (1969) in their experiment with rodents gave evidence of an accelerated growth of the mandible reaching maximum value prior to horizontalization. Harris and Morgan (1969) considered Meckel's short cartilage as the cause of the development of cleft palate. A short mandible was also found in mice embryos with genetically fixed cleft palate (Fitch, 1961). Equally, Jelínek and Peterka (1977) studied in detail the role the mandible played in the horizontalization of the palate plates. They confirmed that the necessary condition for horizontalization is the growing distance between the tongue and the roof of the oral cavity, a process caused by the growth of Meckel's cartilage. The function of this mechanism in rat embryos was also described by Diewert (1981).

We presume that the damage to the mandibular anlage can be simultaneously accompanied by damage to the dental crest where the individual dental germs develop. This presumption serves as basis for the tested hypothesis. We had expected a higher rate of hypodontia in milder forms of cleft palate which develop later and under the influence of a stronger teratogenic impulse. The milder the degree of the cleft and the later it develops during embryonal life, the shorter is also the mandible in cases of isolated cleft palate (Šmahel, 1986).

These results also correlate with the dentition defect, i. e. the failure of developing dental germs as seen in our group of patients. In cases of complete and incomplete cleft palate, we found hypodontia in 15—16 % patients, in soft palate cleft in 37.0 %.

Equally, maxillary impairment showed a difference depending on the degree of the cleft. However, the more severe the cleft was, the higher incidence of hypodontia was found. In complete cleft palate hypodontia appeared in 21 % probands, in its incomplete form at a rate of 11 %, in cases of soft palate cleft we found hypodontia only in 1 case (3.7 %).

Our results are in agreement with contemporary knowledge about the anomalies of dentition development in facial clefts.

SUMMARY

The authors studied the incidence of hypodontia in 200 patients with isolated cleft palate. These patients were divided into 3 groups according to the degree of malformation (complete cleft palate, incomplete cleft palate, soft palate cleft). In the 3 groups, hypodontia was studied on permanent teeth, with the exception of the 3rd molars. Compared with the healthy population, hypodontia in patients with cleft palate appeared at a significantly higher rate (25.5 %). No difference was found between boys and girls. Hypodontia in the mandible appeared in 18 %, in the maxilla in 10 %. The upper jaw showed maximum incidence in complete cleft palate (21 %), while in the mandible hypodontia was observed most frequently in soft palate clefts (37 % patients). In most cases the dental germs of the 2nd lower premolar failed to develop.

Our results correlate with hypotheses based on experimental studies on the etiopathogenesis of facial clefts.

RÉSUMÉ

Hypodontie chez patients avec fente palatine isolée, relation avec étiopathogénèse du défaut

Jiroutová, O.

Nous avons suivi l'incidence de l'hypodontie chez 200 patients avec la fente palatine isolée. La classification de la fente était triée suivant le degré d'atteinte (fente palatine totale, incomplète et fente du palais mou seulement). L'hypodontie était recherchée dans tous les groupes de dents permanentes, à l'exception des troisièmes molaires. En comparaison avec la population saine, l'hypodontie chez les patients atteints par une fente palatine représente une fréquence expressivement élevée (25,5 %). On n'a pas trouvé de différences entre l'atteinte des garçons et des filles. L'hypodontie était présente en 18 % au maxillaire inférieur et en 10 % au maxillaire supérieur. L'atteinte du maxillaire supérieur était le plus marquée chez la fente palatine totale (21 %), l'atteinte du maxillaire inférieur était constatée seulement chez la fente du palais mou (37 %). Le bourgeon dentaire non formé était le plus souvent la seconde prémolaire inférieure.

Nos observations correspondent aux suppositions découlées des études expérimentales sur l'étiopathogénèse du défaut.

ZUSAMMENFASSUNG

Hypodontia bei Patienten mit isolierter Gaumenspaltung
Beziehung zur Aetiopathogenesis des Defekts

Jiroutová, O.

Wir haben das Vorkommen von Hypodontia bei 200 Patienten mit isolierter Gaumenspaltung verfolgt, die in drei Gruppen eingeteilt wurde je nach dem Grad des Befallens (vollkommene Gaumenspaltung, unvollkommene Gaumenspaltung und Spaltung nur des weichen Gaumens). Hypodontia wurde an allen Gruppen der bleibenden Zähne festgestellt, mit Ausnahme der dritten Mahlzähne. Im Vergleich mit der gesunden Bevölkerung zeigte das Vorkommen der Hypodontia bei Patienten mit Gaumenspaltung eine ausgeprägt höhere Frequenz (25,5 %).

Zwischen den betroffenen Knaben und Mädchen wurde kein Unterschied festgestellt. Im Unterkiefer kam Hypodontia in 18 % der Fälle vor, im Oberkiefer in 10 %. Der Oberkiefer wurde am ausgeprägtesten bei vollkommener Gaumenspaltung betroffen (21 %), der Unterkiefer bei einer Spaltung nur des weichen Gaumens (37 %). Der am häufigstens nicht gegründete Zahnkeim war der zweite untere Prämolarzahn.

Unsere Befunde entsprechen den Voraussetzungen, die aus den Experimentalstudien über die Aethiopathogenesis des Defekts gefolgert wurden.

SUMARIO

Hipodoncia en los pacientes con la fisura palatine aislada
La relación con la etiopatogenesis del defecto

Yiroutová, O.

El papel presenta un estudio de la incidencia de hipodoncia en un grupo de 200 enfermos con la fisura palatina aislada; los pacientes fueron divididos en tres grupos según el grado del defecto (la fisura palatina completa, incompleta y la fisura solamente del velo). La hipodoncia fue investigada en todos los grupos de los dientes permanentes, con excepción de los terceros molares. En comparación con la población normal, la incidencia de hipodoncia en los enfermos con la fisura palatina fué significativamente más frecuente (25,5 %). Ninguna diferencia fué hallada entre los muchachos o las muchachas. La hipodoncia apareció en la mandíbula en 18 % de los casos, en el maxilar en 10 % de los pacientes. El defecto del maxilar más significativo fué en los pacientes con la fisura palatina completa (21 %), el máximo defecto en la mandíbula apareció en los casos con la fisura solamente del velo (37 %). La ausencia de la formación del germen del diente se observó con la más frecuencia en el segundo premolar inferior.

Los hallazgos están de acuerdo con la hipótesis basada en los estudios experimentales sobre la etiopatogenesis del defecto.

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The other references are available
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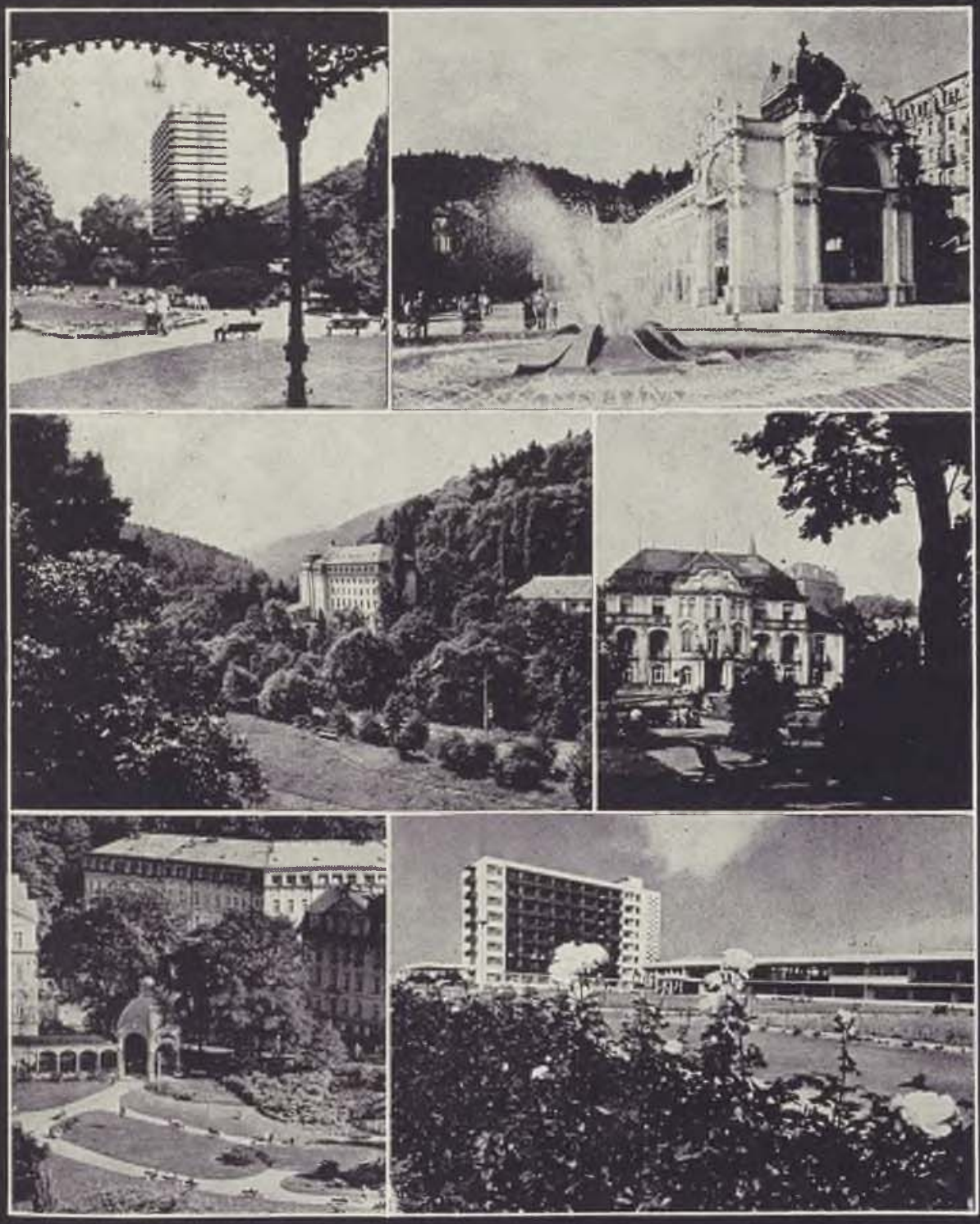

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