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HYPOSPADIAS - A TREND TOWARDS ONE-STAGE REPAIR

A. Kipikaša, I. Jugenburg, Š. Guzanin

The basic strategic objective in planning any hypospadias repair is to eliminate or at least to achieve a substantial alleviation of the effect of the hypospadias-producing noxa. Depending on the length of the noxa action, its intensity and on the susceptibility of the embryonic groundwork for the formation of the urethra and penis we can judge the gravity of the consequences — the degree of hypospadias.

The degree of hypospadias appears to be directly related to the intensity and length of time of the noxa action as well as to the degree of susceptibility of the embryonic groundwork for the development of the urethra and penis to the noxa concerned. Deformation in hypospadias affects mainly the urethra and the skin cover.

The urethra is noted for its anomalous opening on the ventral side anywhere from the glans down to the perineum. The more proximalward is the opening of the hypospadic urethra, the more conspicuous is another, related deformation — chordee, the downward bowing or contracture of the penis. The bowing is partly due to the chorda — fibrous tissue situated from the base of the glans down to the hypospadic urethral meatus, often extending even more proximalward, and the skin unevenly distributed over the penis, i. e., lack of it on the urethral side, and in an excessive quantity on the dorsal side of the penis, particularly in the preputial region.

All the strategic objectives of reconstruction can be summed up in the following two main tactical moves:

1. elimination of chordee to straighten the penis,
2. reconstruction of the defective part of the urethra.

The two tactical procedures go hand in hand with the need to achieve an even distribution of the skin cover all over the circumference and length of the penis. The classical and basic objectives of urethral reconstruction are best met by the use of urethroplasty according to:

a) Nové-Josserand, who used a free skin transplant sutured all over the circumference to a stent of the same size as the preserved part of the urethra (1),

b) Duplay (2) modified in 1949 by Denis Browne, who gave it the present name (3). His method makes use of the marginal epithelialization of the stripe of skin situated lengthwise and extending from the hypospadic meatus up to the glans.

Practicallly all the other surgical techniques, almost too many now to keep track of, are diverse modifications and combinations of the above two methods.

While in the past nearly all hypospadias repair operations were performed in stages, since 1957 there has been a trend to use one-stage techniques wherein the elimination of chordee (straightening) and urethroplasty are combined in a single operation.

Charles E. Horton and Charles J. Devine, jr. and their coworkers (4) must be regarded as the pioneers of one-stage hypospadias repairs. Practically simultaneously with the above listed authors, perhaps independently of them or possibly inspired by their approach, Broadbent (7), Aronof (8), Mustardé (9) and others began to introduce one-stage operations, too.

However, one cannot possibly leave out Ombrédanne, who stood at the very cradle of one-stage hypospadias repairs of the distal part of the urethra back in 1911 and 1926, and whose method has retained its value to this day (5, 6).

MATERIAL AND METHOD

Our centre has been engaged in hypospadias treatment since 1953. Since then we have tried out practically all the basic surgical techniques, and developed our own modification of the Denis Browne operation as a method of choice (10). In the past, the Nové-Josserand and Ombrédanne operations were the ones we used the longest, making substantially less use of the Brown operation, and, in the past 8 years or so, making the most of the one-stage Horton-Devine method.

The following material is an analysis of clinical records on 502 patients treated for hypospadias at our clinical department between 1953 and 1986. As a matter of interest, we split the number into two subgroups, namely a) from 1953 to 1976, and b) the past 10 years, which made it possible for us to study the trend at our own clinical centre.

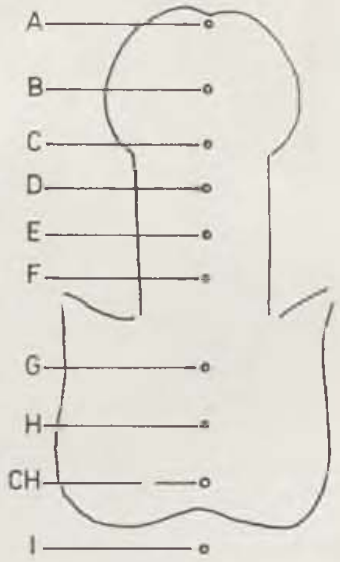
Schema — Classification of hypospadias
Table 1 — Number of patients by anomaly type
Graph 1 — Age-related percentage of operations
Table 2 — Operations 1953—1975 and 1976—1986
Graph 2 — Percentage of hypospadias types

RESULTS

We used a ten-degree classification of hypospadias which is not all that often used in literature and which permitted us to make a more detailed

analysis of our group. The characteristics of each type are indicated in the schema.

Table 1 gives an analysis of each of the hypospadias types depending on the narrowing of the meatus and on the presence of penile contracture, which is important in terms of planning the required operation. Meatal narrowing



Schema — Classification of hypospadias by urethral meatus localization

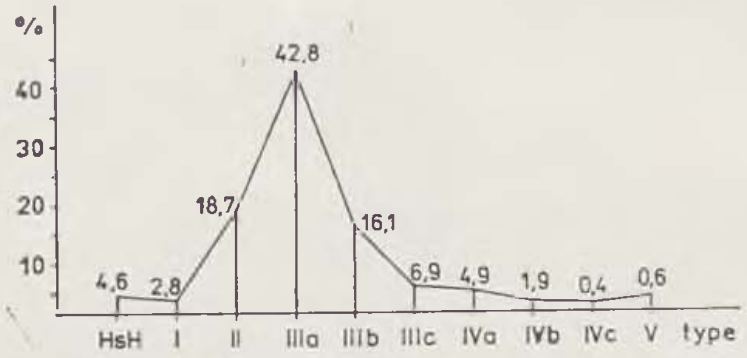
A ..... HsH (cryptohypospadias)
B ..... I H. glandularis
C ..... II H. sulcuc coronarius
D ..... IIIa H. penil. dist.
E ..... IIIb H. penil. med.
F ..... IIIc H. penil. prox.
G ..... IVa H. scrot. dist.
H ..... IVb H. scrot. med.
I ..... IVc H. scrot. prox.
J ..... V H. preinealis

Table 1. Number of hypospadias patients in absolute figures by the type of the anomaly and the presence of ventral flexion and meatal narrowing

	HsH	I	II	IIIa	IIIb	IIIc	IVa	IVb	IVc	V
Total	23	14	94	215	81	35	25	10	2	3
Contracture	23	1	6	57	43	30	20	10	1	3
%	100	7	7	27	53	85	80	90	50	100
Narrowing	1	8	55	53	9	1	3	0	0	0
%	4	57	57	25	12	3	12	0	0	0

characteristic of minor hypospadias involvement, which is why it is not found in subgroup IIIc and further down the list. Vice versa, the rate of flexion contracture rises in proportion to the gravity of the hypospadiac meatus.

The percentage of hypospadias by type is shown in Graph 1. Most of our patients had the mild type of hypospadias with a predominance of the distal penile form — 43 %, followed by the type of hypospadias with the urethral meatus situated in the sulcus coronarius and in the middle third of the penis. This pattern is reported by many authors, though some report a fairly high proportion of proximal hypospadias.



Graph 1. Percentage of types of hypospadias

Table 2 gives a review of operations as recorded in our clinical documentation. As for reconstructive urethroplasty, most of our operations were ac-

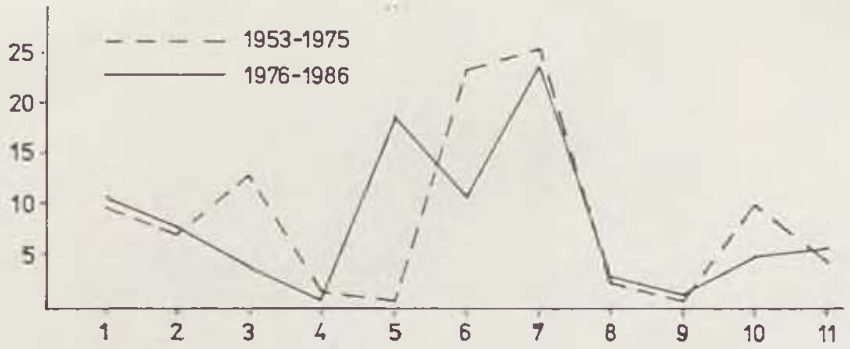
Table 2. Operations for 1953—1975 and 1976—1986 in absolute numbers

Operation	1953—1975	1976—1986	Total
1. Meatoplasty	101	56	157
2. Ombrédanne	66	40	106
3. Nové-Josserand	105	20	125
4. Browne	32	2	34
5. Horton-Devine	7	100	107
6. Chordectomy	214	56	270
7. Closure of fistula	217	119	336
8. Skin repair	23	18	41
9. Derotation	3	1	4
10. Anastomosis	102	25	127
11. Other neourethra	40	31	71

cording to Nové-Josserand, followed by repairs according to Horton-Devine and Ombrédanne. Meatoplasty as a separate operation was resorted to in patients of young age for reasons of urgent indication. In the rest of the cases, meatoplasty was performed in one stage together with urethral reconstruction.

Graph 2 shows the differences in the periods of time under review.

1. Meatoplasty — Burian's V-Y plastic operation is used the most frequently as a separate operation.
2. Ombrédanne — a method used in the second period under review until it was totally replaced by the Horton-Devine operation.
3. Nové-Josserand — a drop from 12 % to 4 % can be observed. This is because the Horton-Devine operation provides a single-stage solution to even the more serious degrees of hypospadias.



Graph 2. Age-related percentage of operations

4. Browne — a rather little used method, hardly ever employed in the past ten years.
5. Horton-Devine — used on 107 patients over the recent period.
6. Chordee, if present, is used in any case either as a separate operation or as part of a one-stage operation — as indicated by the graph-registered drop over the second period under study.
7. Closure of fistula — unfortunately, there has been no radical change there, though it appears that far fewer fistulae develop with the Horton-Devine method.
8 This is where we confined ourselves to excess skin excision following previous surgery when excess skin was left in place should that be needed later on.
10. Anastomosis according to Vejválka and Farkaš. If the number is greater than that of Nové-Josserand operations this is because it often involved closure of a fistula so wide that the surgeon preferred registering the operation as an anastomosis.
11. Other type of neourethra. In such cases, the method according to Kipikaša, Savčenko was used suo modo.

The desired outcome of any successful hypospadias repair is: straightened penis, adequately sized and long neourethra of evenly distributed lumen, free from fistulae, with meatus situated at the apex of the glans penis, and even distributed skin cover all over the circumference and length of the penis. As

the results show, all the multi-stage operations as well as the Ombrédanne operation make for a well straightened penis.

The neourethra terminates at the apex of the glans in nearly all cases operated on according to Nové-Josserand and Ombrédanne. With the Browne operation we achieved neourethral meatus at the apex of the glans only if we used our own modification of the technique. After all, the aim of the original Browne operation is to have the neourethral meatus in the sulcus coronarius glandis.

In our patients operated on in one stage according to Horton-Devine we nearly always achieved a well straightened penis, an adequate urethra and, in addition, an anatomically well shaped glans penis.

COMPLICATIONS

Early: haematoma, infection, oedema, necrosis.
Late: fistula
stricture — at the neourethra-urethra anastomosis
— at the apex
— elsewhere (after major fistula closure)
short urethra
too long, S-shaped urethra
pre-stricture diverticulum
calculosis in urethra

Provided the same principles of atraumatic surgery, pre-operative preparation and post-operative treatment are observed all operations are likely to develop the same rate of complications in hypospadias of the same type.

DISCUSSION

The greatest problems are encountered in the treatment of perineal and scrotal hypospadias as these require special attention and an individual approach, which is why we did not include them in our series. Fortunately, they are few and far between so that they would represent a small proportion anyway. Penoscrotal up to subglandular hypospadias can be dealt with successfully using multi-stage as well as one-stage operations. For that reason they can be well assessed and compared in the group.

As our results suggest, there is no substantial difference in the final result between multi-stage operations, especially the Nové-Josserand method, and one-stage surgery according to Horton-Devine. The classical Browne operation does not guarantee neourethral termination at the apex of the glans.

Let us add that one-stage operations place substantially more demands on atraumatic surgery and on the length of the operation. Then, how to explain the trend to abandon multi-stage operations for one-stage methods? The answer is simple. Provided the penis is well developed, the operation can be

ventured at a younger age, thus making it possible to complete the surgical treatment well within the pre-school age. This is of great importance for the patient's emotional and mental development. Moreover, fewer instances of general anaesthesia is in itself a factor to be welcomed, and so is, in economic terms, the reduction in the number of operations, hospitalizations, and days spent in hospital. The parents' psychic traumatization is also a factor to be taken into account. Considering our experience coinciding with that of other authors, we are definitely for an individual approach to the planning and realization of surgical treatment for hypospadias. Provided the anomaly is detected and registered sufficiently early we recommend surgery in pre-school age. We have had fully satisfactory experience using the Horton-Devine operation, which is why we continue to employ it as a method of choice in most cases to this day and why we can recommend it. One thing to be borne in mind, though, is that a surgeon specializing in the surgical treatment of hypospadias must have a maximum degree of manual dextrity, he must not avoid microsurgical techniques, and should be able to use a whole variety of other surgical techniques to the desired purpose.

By way of conclusion let it be said that:

— When two do the same, it is never the same. Intentionally or unintentionally, each surgeon is likely to add a personal touch to whatever technique he uses. This may account for the different degree of success or otherwise of the same method used by different surgeons.

— As a rule, the introduction of a new surgical technique is marked by a higher rate of complications. Nevertheless, those who master this rather demanding one-stage surgical technique are bound to favour it.

SUMMARY

The post-operative results were studied in patients treated for hypospadias at the Department of Plastic and Reconstructive Surgery, Košice, in 1953—1986. A total of 502 patients were operated on during that period.

An analysis of the operations and post-operative results was made. The most frequent cases were of hypospadias with urethral meatus in the distal part of the penis (42.8 %), in the sulcus coronarius and in the medial third of the penis (16—18 %). The most frequently used methods were operations according to Ombrédanne, Nové-Josserand, and Horton-Devine.

As for the outcome, no major difference was found between multi-stage and one-stage repairs. The Horton-Devine one stage operation places substantially greater demands on skills in the atraumatic surgical technique and on the time needed to complete the operation. However, the reduced number of general anaesthesias, operations and better rather than worse results made the authors adopt this particular surgical approach over the past ten years. The Horton-Devine one-stage repair has proved its worth, which is why the authors now use it predominantly as a method of choice and recommend it as such.

RESUME

Hypospadias — tendance aux opérations en un temps

Kipikaša, A., Jugenburg, I., Guzanin, Š.

Les auteurs ont suivi les résultats postopératoires des malades traités pour l'hypospadias à la Clinique de la chirurgie plastique et reconstructive à Košice, dans les années 1953—1986. Dans cette période on a opéré 502 patients.

Les auteurs ont effectué l'analyse d'interventions et de résultats postopératoires. Le plus fréquent était l'hypospadias avec l'embouchure du méat urétral dans la partie distale du pénis (42,8 %), puis avec l'embouchure au «sulcus coronarius» et dans la partie moyenne du pénis (16—18 %). Quant aux méthodes utilisées, le plus souvent on a exécuté les opérations d'après Ombrédanne, Nové-Josserand et Horton-Devine.

On n'a pas constaté d'importantes différences entre les résultats d'opérations à un temps et d'opérations à plusieurs étapes. L'opération en un temps selon Horton-Devine est considérablement plus exigeante à une technique opératoire atraumatique et à la durée d'intevention. Quand-meme, la réduction du nombre d'anesthésies générales et d'interventions et les résultats non pires, mais meuilleurs, ont donné justification au choix des auteurs, qui ont adopté cette méthode opératoire pour les dix dernières années. Puisque l'opération en un temps selon Horton-Devine a fait ses preuves, les auteurs la choisissent de préférence et la recomandent.

ZUSAMMENFASSUNG

Hypospadia — Trend zu Einetappenoperationen

Kipikaša, A., Jugenburg, I., Guzanin, Š.

Die Autoren verfolgten die Resultate nach Operationen bei Patienten, die an der Klinik für plastische und rekonstruktive Chirurgie in Košice 1953 bis 1986 wegen Hypospadia behandelt wurden. Im Verlauf dieser Zeitspanne waren es 502 operierte Patienten.

Die Autoren arbeiteten eine Analyse der Operationen und der Resultate nach den Operationen aus. Am häufigsten trat Hypospadia mit Ausmündung im distalen Teil des Penis auf (42.8 %), und dann sulcus coronarius im mittleren Teil des Penis (16—18 %). Von den angewendeten Methoden wurde am häufigsten eine Operation nach Ombredanne, Nové-Josserand und Horton-Devine angewendet.

Es wurde kein wesentlicher Unterschied im endgültigen Resultat zwischen Mehretappen- und Einetappenoperationen festgestellt. Die Einetappenoperation gemäss Horton-Devine ist wesentlich anspruchsvoller, was die atraumatische Operationstechnik und die Länge der Operation betrifft. Jedoch die geringere Anzahl der Gesamtanasthesien, Operationen sowie die nicht schlechteren, ja sogar besseren Ergebnisse bildeten die Ursache dafür, dass die Autoren in den letzten 10 Jahren zu dieser Operationstechnik übergingen. Die Einetappenoperation gemäss Horton-Devine hat sich völlig bewährt, und deshalb wird sie in der überwiegenden Mehrheit der Fälle gewählt und auch empfohlen.

RESUMEN

Hipospadia — tendéncia hacia las operaciones de una etapa.

Kipikaša, A., Jugenburg, I., Guzanin, Š.

Los autores vigilaron a los resultados posoperatorios en enfermos, sometidos al tratamiento en la Clínica de la Cirugía Plástica y de la Reconstrucción en Košice en el

período 1953—1986 con motivo de la hipospadia. A lo largo de éste tiempo a la operación fueron sometidos 502 enfermos.

Efectuaron análisis de las operaciones y de sus resultados. Más frecuentemente tuvo lugar la hipospadia con la desembocación en la parte distal de penis (42,8 %), después en sulcus coronarius y en la média parte del penis (16—18 %). De las técnicas más a menudo empleadas fueron usadas operaciones según Ombrédanne, Nové-Josserand y Horton Devine.

No fué comprobada la diferencia sustancial en el resultado final entre las operaciones de más etapas y las de una etapa. La operación de una etapa según Horton-Devine es esencialmente más exigente en la técnica operatoria sin traumas y en la prolongación de la operación. Sin embargo, la reducción del número de anestesías totales, de las operaciones, y no más malo, sino al revés — más mejor resultado fué la causa, por la cual los autores a lo largo de últimos 10 años aceptaron a éste método operatorio. La operación de una etapa según Horton-Devine dió buenos resultados, por eso la realizan y recomiendan en mayoría casos como uno de más elegidos métodos.

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BLEPHAROPLASTY OF THE LOWER EYELIDS

K. Fahoun

Correct measurement and sketch-mapping of the size of the planned skin excision is the principal part of the surgical strategy. For that reason, we proceed very cautiously and conservatively to avoid undesirable complications. A more conservative excision of excess skin is far less of a mistake than a more radical cut. The planned excision should be measured off and outlined on the lower lid with the eyes opened up as much as possible looking upwards. The upper edge of the excision should be marked in about 1.5 mm along the lower margin of the eyelashes edging a little away from the outer canthus. The subsequent procedure is in planning the excision of excess skin on the upper eyelids. Holding a pair of tweezers in the left hand we shirr the excess skin marking it with several points, then linking the points in a continuous line to mark out the lower edge of the excision. Near the outer canthus we smoothly joint the two lines to make the resultant suture run slightly upwards. The width of the planned excision ranges between 5 and 10 mm. Blepharoplasty of the lower eyelids comes first, prior to operation on the upper eyelids. Blepharoplasty of the upper eyelids as a second-stage operation will help us achieve an aesthetic line of sutures running smoothly slightly upwards from the outer corners, thus giving the palpebral fissures a fine shape and preventing a downward pull of the temporal canthi. In single-time blepharoplasty or the upper and lower eyelids we never allow the lines of the two sutures to join each other. Joining those sutures together would put us at a disadvantage as it would mean suturing together three types of skin of unequal thickness and quality. That is why we always leave in a bridge of skin.

Following incision of the marked lines we resect the excess skin with a scalpel, proceeding from the outer corner with short cross cuts. Where blepharoplasty of the lower eyelids was indicated for hypertrophy of the pretarsal portion of the orbicular muscle of the eye we resect also part of that muscle along with the skin excess. Whatever little bleeding there is need not be arrested in any way other than short-term applications of moistened mull. No skin mobilization is needed. In cases where the operation is indicated for fat prolapses, even a small skin excision will give us ample room for muscle

discission. At reoperation, a mere excision of the old scar will serve the purpose well. A slight pressure on the eyeball facilitates work as it helps to tighten up the orbicular muscle (Fig. 1).

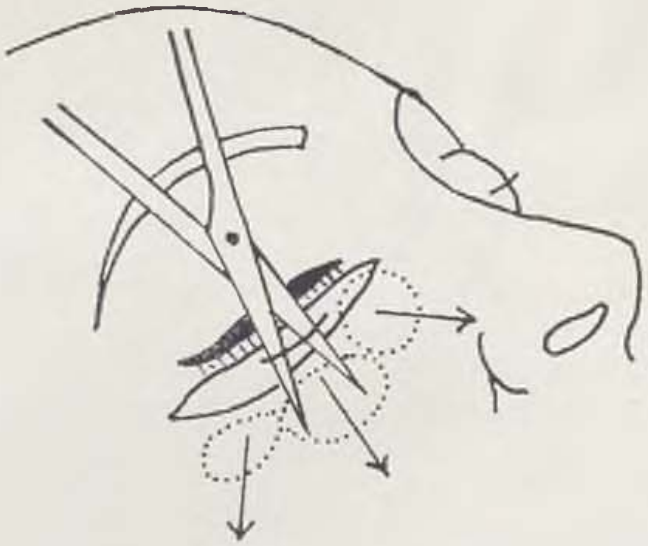

Fig. 1 Blepharoplasty of the lower eyelids

Fat prolapses are resected in the medial part of the orbicular muscle with a longitudinal central discission along the muscle fibrils. Using the tip of scissors we cut downwards until we touch the lower margin of the orbit. Then we withdraw the scissors a little and open them to allow the assistant surgeon to catch hold of the edges of the opening with eye hooks. Pulling the scissors out we can usually see the central fat prolapse slipping out. Catching hold of its tip with tweezers we mobilize the prolapse holding it gently with a fine curved forces at the base. Proceeding along the upper edge of the forceps we resect the prolapse with scissors, and then place a fine catgut ligature along the lower edge of the forceps. With the ligature being tied up the assistant can gradually release the forceps. Ligature of the fat prolapse neck is a safe way of arresting haemorrhage. Coagulation should not be relied upon as bleeding in the resection of fat prolapses on the lower eyelid can pose a considerable hazard.

Using a forces and scissors we penetrate from the same opening in the muscle via the septum to the inner and outer fat prolapses which we then resect in a similar fashion. Dispensing with suture we leave the discission opening as it is for spontaneous contraction and adaptation, being careful about the size of fat resection to avoid any sinking of this region. We use spot coagulation along the course of the muscle fibrils to strengthen the flabbiness of the muscle found rather frequently in elderly patients. We then suture the skin with an external continuous suture using a fine silk fibre attached to an atraumatic needle.

This procedure was developed at our department of plastic surgery, and has been in routine use since 1976. We first reported on the technique at the

1978 scientific conference of plastic surgery and corrective dermatology in Prague. The advantages of this method were assessed on a total of 1000 patients and presented at a 1983 scientific conference in Prague held to mark the 25th anniversary of the Institute.

The advantages of our technique compared with conventional methods:

1. The operation is a more physiological affair as it causes less tissue traumatization —
   a) dispensing with skin mobilization, thus reducing the area of operative and post-operative haemorrhage as well as the incidence and size of post-operative cutaneous and subcutaneous haematoma;
   b) reducing the area of post-operative scarring all over the surface of previously mobilized skin;
   c) permitting resection of all three fat prolapses from a single central discission.
2. Fewer complications —
   a) smaller post-operative oedema;
   b) smaller skin haematoma;
   c) lesser risk of deep haematoma thanks to fat prolapse ligation;
   d) no danger of late ectropion due to scarring all over the area of skin mobilization and subsequent contracture of cicatricious tissue.
3. Shorter post-operative healing time.
4. Simpler operative technique.
5. Shorter operating time.

Relative disadvantage of our surgical technique:

Excess skin is resected in a single phase at the beginning of the operation. This places a great emphasis and demand on correct and precise measurement and marking out of the planned resection. This is where the surgeon's experience is crucial, but then this is essential in any blepharoplasty.

SUMMARY

The author presents his method of blepharoplasty of the lower eyelids with excess skin resection at the start of the operation, without skin mobilization and with the resection of all three fat prolapses from a single central discission of the orbicular muscle.

RESUME

Blépharoplastie des paupières inférieures

Fahoun, K.

L'auteur présente une méthode de blépharoplastie des paupières inférieures avec une résection de peau superflue, effectuée en premier plan. La plastie est mise en oeuvre sans mobilisation de la peau, por une résection de tous les trois prolapsus graisseux, d'une seule discision centrale du muscle orbiculaire.

ZUSAMMENFASSUNG

Blepharoplastik der unteren Lider

Fahoun, K.

Der Autor beschreibt die Methode der Blepharoplastik der unteren Lider mit Resektion des Hautüberschusses bei Beginn der Operation, ohne Mobilisierung der Haut und mit Resektion aller drei Fettprolapse aus einer zentralen Diszision des kreisförmigen Muskels.

RESUMEN

Blefaroplástica de párpados inferiores

Fahoun, K.

Por el autor está prestado el método de la blefaroplástica de los párparos inferiores con la resección del exceso cutáneo en principio de la operación, sin la movilización de la cutis y con la resección de todos tres prolapsos de grasa de una discisión central del músculo orbicular.

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THE SIGNIFICANCE OF MICROFORMS OF CLP FOR ANOMALIES AND MALFORMATIONS OF THE JAWS AND FACE

J. Schubert, H. Metzke, H. Bittroff, J. Hintz, H. Lindner

The multifactorial etiology of cleft lip and palate (CLP) is generally accepted for most of the clefts in man. It is a system of additive polygeny with threshold effect. Before the major malformation manifests there are different clinical signs of minor deformities called minor forms (mf) or microsymptoms or minor signs. Although in most cases there is no doubt of their connection with the cleft, there is, however, no agreement on the symptoms to be considered as mf and their significance for recurrence risk and genetic counselling.

Up to now a high incidence of symptoms in the first degree relatives of cleft probands has been an important criterion for evaluating a symptom as mf. We did not find other statements in literature. Therefore we have tried to define more precisely the significance of mf using extented investigations in families with positive cleft history.

METHOD

1st to 3rd degree relatives of randomized non-syndromic cleft patients treated in our clinic were clinically investigated. In addition to the case history we analysed the mf listed in table 1 according to Tolarova (1969) and Hillig (1982). With regard to incidence, form of clefts, sex etc. the cleft patients were in conformity with the statements in literature. They were divided both in accordance with Fogh-Andersen's etiologic-embryologic classification and regarding familial or sporadic occurence. Different dependences were analysed at 1 % or 5 % level by χ^2-test.

RESULTS

The most important results are compiled in table 1. It must be born in mind, that by analysing 1338 relatives, only 48,7 % of all possible first to third degree relatives could be investigated. In the relatives of CL ± CP patients the

Table 1. Incidence of microforms of cleft lip and palate in different groups including control

Microforms	Relatives of cleft patients (n = 1338)									Patients with jaw anomalies (n = 200)	Normal population	
	familiar cases (n = 255)			Σ	sporadic cases (n = 1083)			Σ	all relatives n / %		1 st degree relatives of probands with microforms (n = 200)	general (n = 2710)
	1 st degree n = 94	2 nd degree n = 104	3 rd degree n = 57	%	1 st degree n = 392	2 nd degree n = 457	3 rd degree n = 234	%		n / %	n / %	n / %
Deformity of the nose	—	1	—	0.4	12	11	1	2.2	25 / 1.9	—	—	1 / 0.04
Notch of the lip	—	1	—	0.4	5	3	1	0.8	10 / 0.8	1 / 0.5	—	—
Hypoplasia of the premaxilla	6	7	5	7.1	9	9	3	1.9	39 / 2.9	1 / 0.5	—	2 / 0.07
Anomaly of the lateral incisor	7	9	3	7.5	25	21	13	5.4	78 / 5.8	7 / 3.5	11 / 5.5	35 / 1.29
Σ primary palate	13	18	8	15.3	51	44	18	10.2	152 / 11.4	9 / 4.5	11 / 5.5	38 / 1.4
Fusion disturbances in the midline of palate	1	2	—	1.2	5	5	5	1.4	18 / 1.3	2 / 1.0	3 / 1.5	11 / 0.41
High palate	11	11	7	13.3	45	52	20	10.8	146 / 10.9	8 / 4.0	11 / 5.5	19 / 0.7
Submucous cleft	—	4	—	1.7	1	4	2	0.6	11 / 0.8	1 / 0.5	—	—
Uvula bifida	4	3	5	4.7	17	8	9	3.1	46 / 3.4	3 / 1.5	5 / 2.5	24 / 0.88
Velopharyngeal incompetence	—	1	—	0.4	2	—	—	0.2	3 / 0.2	1 / 0.5	—	—
Σ secondary palate	16	21	12	19.2	70	69	36	16.2	224 / 16.7	15 / 7.5	19 / 9.5	54 / 2.0
All microforms n	29	39	20	88	121	113	54	288	376	24	30	92
%	30.9	37.5	35.1	34.5	30.8	25.2	23.1	26.3	28.1	12.0	15.0	3.4

grade of recording was higher in parents and siblings of the proband (86,2 %) and also in the familial group (57,9 %) compared with the sporadic one (47,5 %). Therefore we cannot exclude factors of selection, probably depending on the more pronounced form of malformation in those families with a higher motivation for relatives to be investigated and counselled. Taking into account all possible relatives (2746) the incidence of mf in 1st, 2nd and 3rd degree relatives would be 13,7 % in general or 29,3 %, 15,2 % and 17,5 % in the familial group and in the sporadic group 26,0 %, 9,5 % and 8,9 % respectively, assuming that we investigated all with mf. Then the real incidence should be somewhere between these figures and those in table 1.

The significantly higher incidence of mf in the familial group again is at the expense of CL ± CP relatives. Mf of the primary and secondary palate occured with the same frequency. Relatives of CP probands, on the other hand, had had significant more mf of the secondary palate, especially in sporadic cases. Mf occurred with similar incidence in both sexes, but male relatives of male probands had more mf as well as female relatives of female cleft patients. In the familial group the incidence of mf in female relatives was twice as high as in male independently of the proband's sex.

The analysis of the recurrence risk of clefts, according to our definition, could be made only in the familial group. 29 out of 225 investigated persons (12,9 %) were clefted and additionally 21 more distant relatives, not included in the study, too. Regarding all possible 1st, 2nd and 3rd degree relatives we found an incidence of 6,21 % clefts. Alternative cleft types were significantly more seldom and female (!) relatives 1,6 times higher diseased.

DISCUSSION

Undoubtedly mf occur with a high incidence in relatives of cleft probands. Therefore the cleft as the macroform of the malformation cannot be the result of an "all or nothing reaction" as described by Witkowski and Opitz (1979). Mf easily could be explained embryologically using Pfeifer's (1979) teratological lines. Even if "soft" mf (hypoplasia of premaxilla, high palate, "fusion" disturbances) and age-depending mf (uvula bifida) were excluded we did not find relatively other results.

The significance of mf for the recurrence risk of clefts, however, remains uncleared. Certainly, in special cases a more precise individual prognosis might be possible, but generally we did not find a higher risk for clefts in patients with mf in our largest sample of 2nd degree relatives in the familial group, as shown in table 2.

Since none of the relatives in the sporadic group had a cleft, the above mentioned incidence of clefts in children of relatives is generally even much more decreased! Therefore the only possibility to estimate the recurrence risk more precisely as usual is to use the figures of Tolarova (1985) on the basis of the severity of cleft and sex. The last dependence seems to be supported by our study, showing that the female sex, less sensitive for CL ± CP, is more often afflicted with mf (as a "compensatory" reaction ?).

Mf could play an interesting role within the concept of the multifactorial threshold system for the etiology of clefts.

Though we could not produce the evidence for Falconer's prognosises (1965) in case of mf as well as Bixler (1981) for clefts, we take this concept for granted. Furthermore it could be concluded hypothetically, that anomalies of the face and jaws such as mandibular and maxillary prognathism etc. also follow that rule. If we assume disturbances of the same embryonic structures, possibly only at different time (stage) or quantity in both dysplasias, the high incidence of the same mf of clefts in both the groups of patients with jaw anomalies and in relatives of probands with mf in normal population, could be explained. Findings of Demikova and Makarenkova (1983) support our suggestion. The theory of an overall insufficiency of certain tissues (Olin 1964) and further considerations additionally could serve as a common basis.

Table 2. Incidence of clefts and their microforms in children of 2nd degree relatives of cleft patients

Uncles/aunts with	n	Their children with					
		clefts		microforms		normal	
		n	%	n	%	n	%
Clefts	2	2*		1		0	
Microforms	24	1	4.2	7	29.2	16	
Without symptoms	26	1	3.4	11	37.9	17	
	52	4	7.1	19	33.9	33	58.9

*within one family (failure of small number)

Similarly to the increased mortality of CLP combined with early embryonic disturbance as abortion (Shiota 1984) one could find a connection to the late embryonal or even postnatal disturbances such as jaw anomalies, using mf as a connective link. On the basis of the "multifactorial two-threshold model" (Niswander et al. 1972) we would like to postulate hypothetically the "multifactorial multithreshold model". The smallest threshold is for mf with the highest incidence of occurrence, the higher values are for anomalies, clefts and cleft plus abortion with decreasing incidence (Fig. 1).

In this way we can construct the following line of dysplasias (Fig. 2).

Other facts, supporting this are needed and searched for in our continued investigations. An assumed intermediate stage of probands with more than one/person mf we did not find up to now.

Importance for the division of clefts into familial and sporadic cases, however, the mf could get, because we found families with no or only one mf/family within the sporadic group. This subgroup with an incidence of 8,9 % mf (overall size of these families 11 members with an average of 5 investigated)

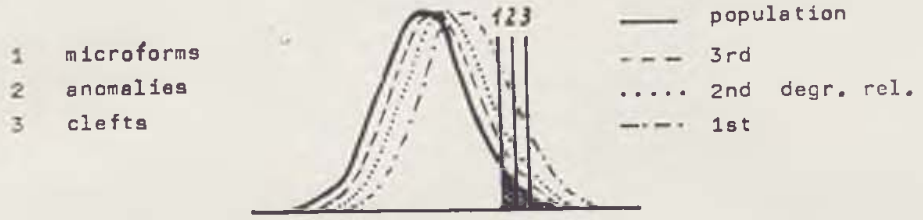

Fig. 1. Scheme of a multithreshold model with different risk for disease of 1st to 3rd degree relatives (1, 2, 3 — thresholds of three different conditions)
1 — microforms, 2 — anomalies, 3 — clefts
——— population
— — — 3rd
. . . . . 2nd degr. rel.
—.—.—. 1st

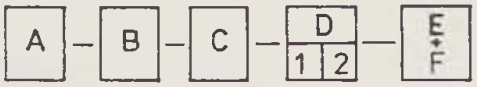

Fig. 2. Possible pathogenetic line of developmental anomalies and dysplasias of the jaws and face
A — norm, B — microform, C — anomaly, D — clefts 1 spor. 2 fam., E — cleft+ + F-abortion

is already nearer the normal population. The remaining subgroup exactly corresponds to the familial group (35,5 % mf) and as a pseudosporadic one probably has to be considered with increased recurrence risk. This fact should be born in mind in genetic counselling.

SUMMARY

In an investigation of 1338 relatives (1st—3rd degree) of 200 cleft patients microforms of cleft lip and palate were analysed. Their overall incidence of 28 % was much higher than in normal population (3,4 %). It was also higher in a group of probands with jaw anomalies (12 %) and in the first degree relatives of probands with mf of the normal (control) group (15 %). A higher recurrence risk for clefts depending on mf could not be demonstrated. However, mf could make possible a subdivision of sporadic cases of clefts into real sporadic and pseudosporadic ones, the last with a probably higher recurrence risk almost that of the familial group. Moreover a new hypothesis about the etiopathogenetic connection between jaw anomalies and clefts both as

forms of facial dysplasia is arised on the basis of a "multifactorial multithreshold model" with mf as connective links.

RESUME

L'importance des microformes de divisions labiales et palatines pour les anomalies et les malformations de mâchoires et de face

Schubert, J., Metzke, H., Bittroff, L., Hintz, J., Lindner, H.

Dans l'exploration de 1338 sujets de parentage (degré I à III) avec nos 200 patients atteints de divisions, on a suivi de près les microformes des divisions labiales et palatines. Leur incidence totale (28 %) était beaucoup plus haute que chez la population normale (3,4 %). Egalement, elle était plus élevée dans le groupe des sujets qui présentaient les anomalies de mâchoires (12 %) et chez les sujets de parentage de 1er degré avec les atteints des microformes de divisions, dans le groupe normal (de contrôle) (15 %). La dépendance du risque d'apparition plus fréquente des divisions de l'apparition des microformes n'a pas été prouvée. Cependant, ces microformes permettent subclassifier les cas sporadiques de divisions aux divisions effectivement sporadiques et aux divisions pseudosporadiques: le risque d'apparition de ces dernières est probablement plus haut, comme presque dans un groupe familial. A part cela, une nouvelle hypothèse surgit, l'hypothèse de corrélation éthiopathogénique entre les anomalies de mâchoires et les divisions, comme formes de dysplasie faciale, à la base du «modèle multifactorial et de plusieurs seuils", les microformes en fonction d'éléments de liaison.

ZUSAMMENFASSUNG

Die Bedeutung von Mikroformen der Lippen- und Gaumenspaltungen für Anomalien und Malformationen der Riefer und des Gesichts

Schubert, J., Metzke, H., Bittroff, L., Hintz, J., Lindner, H.

In einer Studie an 1338 Angehörigen 1. bis 3. Grades von 200 Spaltträgern wurden Mikrosymptome für LKG erfaßt und analysiert. Ihre Häufigkeit lag mit ca. 28 % weit über der in der Normalbevölkerung (3,4 %). Gleichzeitig waren MS aber auch gehäuft in Bevölkerungsgruppen mit Kieferanomalien und bei Verwandten 1. Grades von MS-Trägern der Kontrollgruppe auffindbar. Ein erhöhtes Risiko für Spaltgeburten bei MS-Trägern konnte nicht nachgewiesen werden. Wohl aber könnten MS die Einteilung der Gruppe sporadischer Spaltfälle in echt sporadische und scheinsporadische ermöglichen, letztere mit einem vemutlichen Wiederholungsrisiko nahe dem in der familiären Gruppe. Außerdem wird eine neue Hypothese über den ätiopathogenetischen Zusammenhang zwischen Kieferanomalie und Gesichtsspalten als Ausdruck fazialer Dysplasien, deren Bindeglied die MS sind, auf der Basis eines „multifactorial multithreshold model" aufgestellt.

RESUMEN

Significado de microformas de hendeduras de labios y del paladar para las anomalías y las malformaciones de mandíbula y de la mejilla.

Schubert, J., Metzke, H., Bittroff, L., Hintz, J., Lindner, H.

A lo largo de la investigación de 1338 parientes desde I. hasta III. grado) de 200 enfermos con hendeduras fueron examinadas las microformas de las hendeduras de

labios y del paladar. Su incidencia total (28 %) era más grande que en la población normal (3,4 %), también más alta en el grupo de aprobados con anomalías de la mandíbula (12 %) y de los parientes de I. grado con microformas del grupo normal (control) (15 %). No fué averiguada la dependencia del riesgo de más menuda apariencia de hendeduras en la frecuencia de las microformas. Sin embargo, esas microformas hacen posible a realizar la subclasificación de casos esporádicos de las hendeduras en verdaderamente esporádicas y en seudoesporádicas: esas, por supuesto, tienen más gran riesgo del aspecto de frecuencia — casi como en el grupo familiar. Además de esto surge una nueva hipótesis de la relación etiopatogenética entre las anomalías de mandíbula y las hendeduras como formas de displasías fasciales en base del "modelo multifactorial y multiumbral" con las microformas en función de elementos de unión.

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THE USE OF THE FILATOV TUBULAR FLAP IN REMOVING THE SEQUELS OF EXTENSIVE BURNS IN THE LOWER PART OF THE FACE

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In connection with increasing tendency to traumatism in many developed countries where the able-bodied part of the population is the most affected, the problem of prevention and treatment of injuries is highly topical. In 40 % of cases under observation, the consequences of these injuries, particularly burns, require not only surgical treatment, but also adequate medical and socio-psychological restoration of the victims.

Burns heal with the development of cicatricial deformations of the face, the clinical picture of which depends on the localization, depth and area of the affliction. The severest disfigurements follow after chemical, electrothermic and deep thermic burns. Their healing results in cicatrical deformations of the face with gross anatomico-cosmetic and functional disturbances, frequently extensive and complex, sometimes in combination with defects penetrating into the oral and nasal cavities.

Localization of the injury in the lower part of the face involves not only its centre — the region around the mouth (the lips, the cheeks, the corners of the mouth and the chin), but also the adjacent regions — the nose, the neck, the parotid, masticatory and submandibular regions. Among the multiform deformations of these parts, we can pick out the presence of scarred masses and concretions, disturbance of the relief with flattening or sinking of the prominent parts of the lips, cheeks, nose and chin, smoothing out of natural folds of the face. As a result of development of concentric scars around the oral fissure, we can observe turning of the lips inside out, dislocation of the corners of the mouth, microstoma, epicanthus in the corners of the oral fissure as well as cicatricial contractures of the lower jaw and the neck.

Choosing the method of plasty for the removal of cicatricial deformations presents some difficulties. The character and thickness of the dermoplastic material are closely connected with the depth of the non-penetrating defect in the soft tissues formed during the resection of the whole thickness of the scars. Such a "fresh" defect can be corrected by means of all the known techniques of plastic surgery. Experience and professional skill enable the surgeons to plan many details of the operations immediately after preliminary

evaluation of the clinical picture. An important role is played here by the assessment of the results of measuring the thickness of the tissues of the fronto-lateral walls of the oral cavity shift by shift in norm (Yu. N. Sergeyev, 1981), which testify to a considerable variability of their dimensions.

In cases of extensive disfigurement of the lower part of the face where not only the skin, but also a large part of the subcutaneous cellular tissue and the mimicking muscles have been replaced by scars, the use of local tissues and free dermotransplants is ineffective. In such cases, the application of the Filatov tubular flap in combination with local plasty using transferred tissues is the most rational approach.

In the last few years the interest in the tubular flap according to V. P. Filatov as universal plastic material has unjustly declined. This can be explained, on the one hand, by the multistage character of the plasty, the inconvenience for the patients, and by the long duration of their stay in hospital, on the other hand by modernization of the techniques of plasty using complex transplants of soft tissues including free flaps with microvascular anastomoses. At the same time, indisputable positive qualities of the Filatov flap can also be pointed out, such as its plasticity and endurance throughout the stages of treatment, accessibility and technical simplicity of the surgical methods, abundance of plastic material, the possibility of using it at the early stages for the removal of the most complicated sequels of face injury.

The individual shortcomings of the Filatov flap can be satisfactorily removed by thorough planning of the details and stages of operations, by elaborating new techniques with the inclusion into the pedicles of the flap of nourishing vessels and muscle flaps from the adjacent parts of the face and the neck. The periods of treatment can be shortened by forming figured Filatov's flaps or "sharp" flaps in the upper parts of the thorax, such as the deltopectoral, as also by using physical and medicamental means for the acceleration of maturing of the flaps and migration of their pedicles.

In the last few years the problems of improving the methods of plasty using Filatov's flap in cases of combined defects and deformations of the face have been dealt with in the studies of V. I. Zausayev et al., 1981; M. V. Kazarezov and S. A. Morozov, 1982; S. D. Sidorov, 1983; V. S. Bondar', 1984; J. Zoltan, 1984; F. M. Khitrov et al., 1984; Yu. I. Bernadskii, 1985; N. M. Aleksandrov et al., 1985, and others.

In the clinical department of surgical stomatology of our institute, replacement of extensive combined defects of tissues of the skin, subcutaneous fatty cellular tissue and muscles in the lower part of the face using Filatov's flaps is the principal method of plasty. Since 1970, tubular flaps have been used in 64 patients with sequels of thermic, radiation and electrothermic burns.

On the removal of extensive defects of tissues in the lower part of the face developed after radical resection of scars, their replacement by the tubular flap is possible after migration of both pedicles or one pedicle of the flap. The unfolded dermo-adipose band is feed from excess fatty cellular tissue. To form the relief of the respective portion of the lower part of the

face, this tissue can be preserved in the necessary quantities in certain places of the skin band. There upon, the thickness of the cicatricial tissues is resected to the utmost and the unfolded flap is fixed in the wound in the required position. It is characteristic that the tissues of the flap transferred to the recipient bed are hardly ever subject to secondary deformation and the relief of the part of the face restored by the plasty remains preserved.

In extensive gross cicatrices of the whole lower part of the face in combination with both lips turned inside out and microstomy, we proposed and introduced in practice the following method of plasty. The essential point is that the tubular flap is transferred to the forearm and one of its pedicles is fixed to the edge of the defect or deformation (Fig. 1a, b). At the following stage, the cicatricial tissues of the lips, the chin and one of the cheeks are

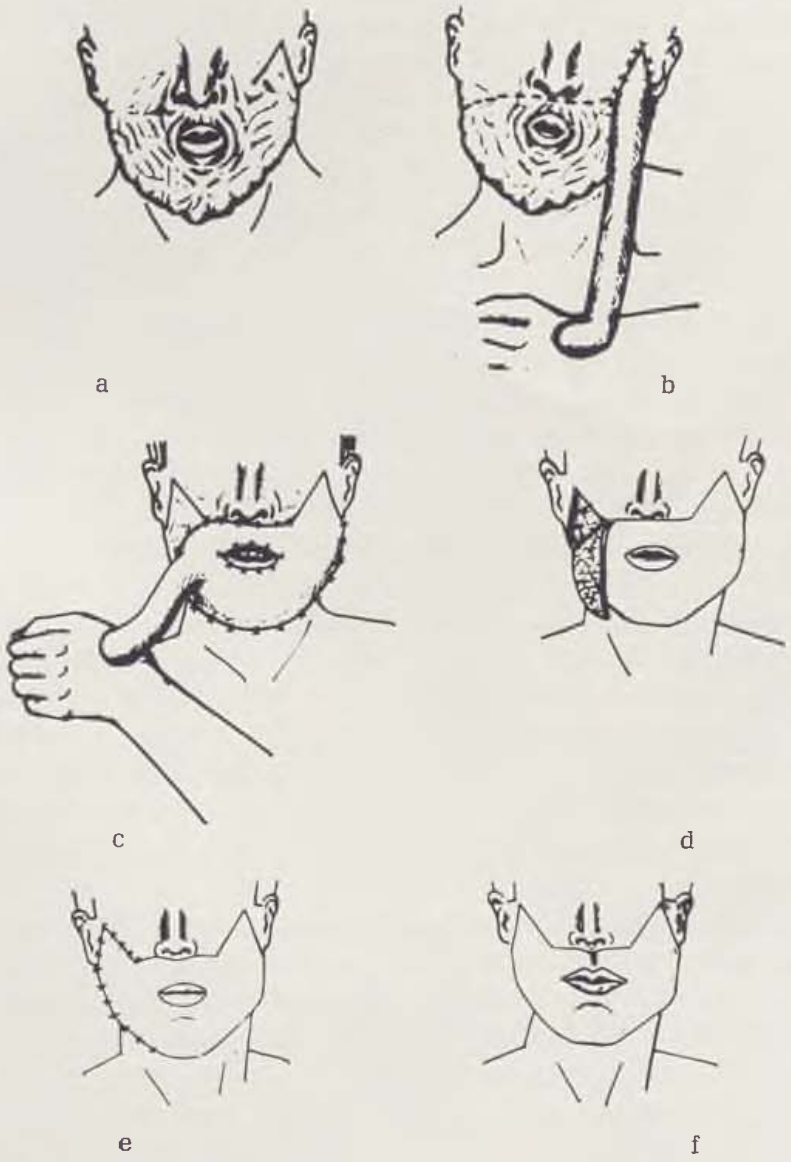

Fig. 1. Schematic presentation of stepwise repair of cicatricial deformation in the lower part of the face by means plasty using Filatov's tubular flap. See text for explanation

excised in their full depth starting from the edges of the healed pedicle of the flap and removing the deformation of the lips and microstoma by dissection of the concentric scars, by maximum mobilization of the margins of the lips and the corners of the mouth as well as by their fixation in normal anatomical position by means of buried sutures. The migrated flap is spread over the longitudinal scar from the base of the pedicle healed to the edge of the face. The formed dermo-adipose band is freed from excess fatty cellular tissue where necessary in accord with the relief of the face, dissected above the oral fissure by means of a penetrating linear incision up to 7 cm in length and placed in the wound bed (Fig. 1, c).

In this manner, the unfolded flap is nourished through two pedicles while the second pedicle remains fixed to the forearm. When the skin band has healed in, the other pedicle is also separated from the forearm and equally unfolded, deprived of fat and fixed in the wound after the remaining scars in the facial, parotid and masticatory regions have been removed (Fig. 1, d, e,). Later on, if necessary, corrective operations with the creation of the corners of the mouth, the philtrum and "Cupid's arch" of the mouth as well as of the adjacent natural folds are carried out (Fig. 1, f). An analogous method was used in the plasty of the lower part of the face by means of a spindle-shaped flap to replace extensive scars of the face and the neck. As an example let us mention a brief extract from a patient's history.

Patient Sh., born in 1934, admitted to our Institute in 1968 with the diagnosis: Combined cicatricial deformation of the face, the neck and the upper extremities after thermic burn. On the initial admission to hospital, the appearance of the scars in the region of the lower part of the face was that of an extensive keloid mass. Deformation of the periocular regions with the eyelids turned inside out, deformation of the perioral region with the lips turned inside out and microstomy, defects of the eyebrows and the outer parts of the nostrils were observed. (Fig. 2, a). Up to 1983, the patient was repeatedly admitted to our Institute for restorative therapy. At the beginning, the interventions consisted in the removal of gross deformations of the eyelids, the nose, the lips and the corners of the mouth by means of plasty using local tissues and, later on, free autodermotransplants. Subsequently, a tubular flap sized 10 × 25 cm was formed on the frontolateral surface of the abdomen and transferred to the lower part of the face and the neck where it was unfolded according to the above mentioned method (see Fig. 2, b). The course of healing was uncomplicated.

The proposed method of removal of gross and deep cicatricial deformations of tissues in the lower part of the face and the neck in combination with the lips turned inside out, microstomy and epicanthus of the corners of the mouth by means of plastic operations using Filatov's tubular flap yields good functional and cosmetic results in restorative therapy of patients with burns.

In order to remove extensive combined deformations complicated by penetrating defects of the walls of the oral and nasal cavities, we used figured T-shaped tubular flaps. Such flaps were transferred stage by stage from various parts of the abdomen to the site of injury through the medium of one of the

forearms. The shorter, transverse, part was mostly used to cover the deformation or defect of smaller size: in the lips or the chin, while the longer pedicle served to repair a more complex defect, such as extensive deformations of the face or the neck. The T-shaped flap, transferred by the pedicles step by step to the edge of the deformation, was unfolded, partly deprived of fat and

Fig. 2a, b, c. Patient Sh. Cicatricial deformation of the face following termic burn
a — before operation, b — intermediate stage, c — after plasty with Filatov's flap

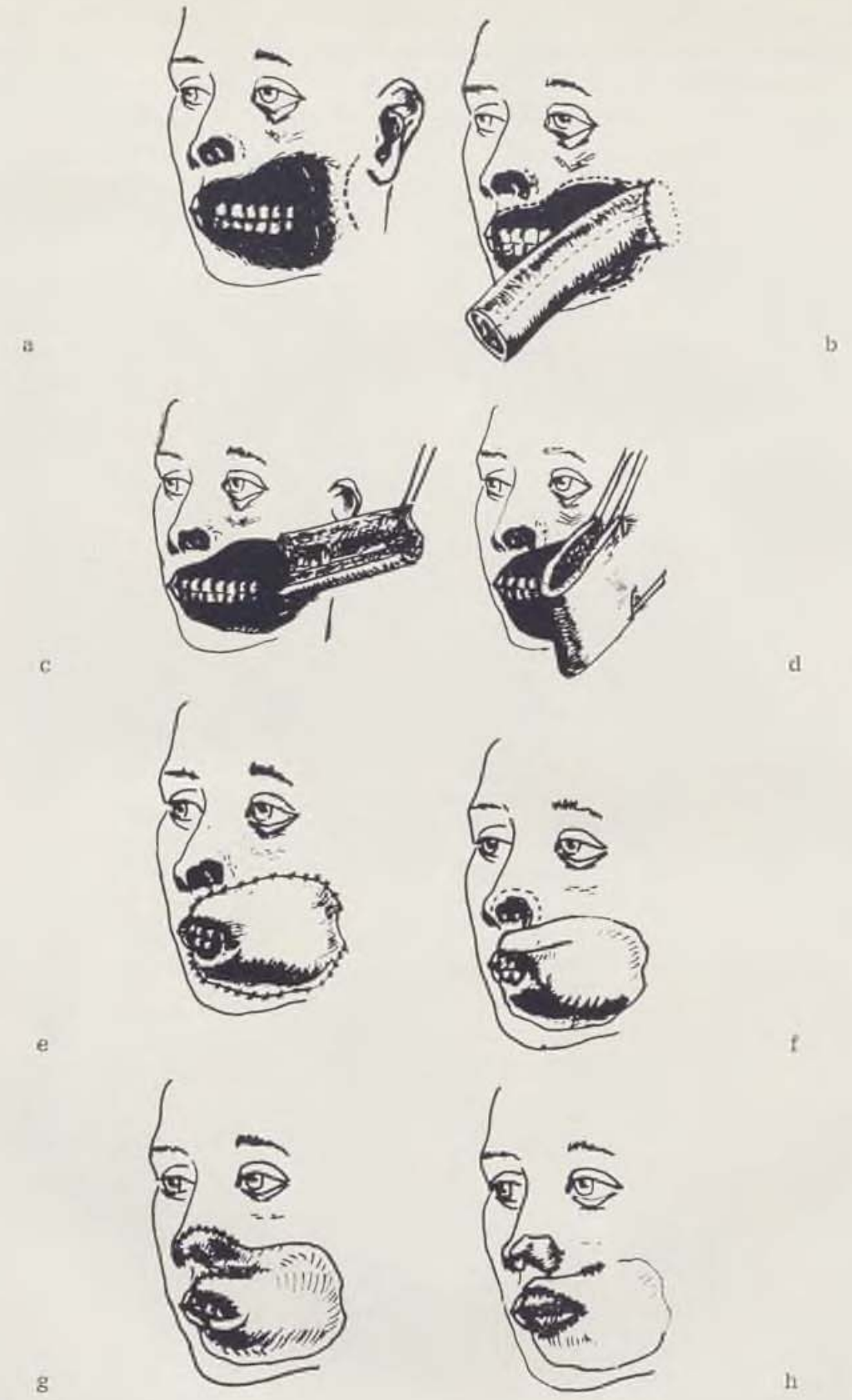

Fig. 3. Schematic presentation of repair of a defect in the perioral region penetrating into the oral and nasal cavities in combination with cicatricial deformation of the surrounding tissues using plastic surgery with duplicature of the Filatov tubular flap. See text for explanation

fixed in the prepared wound. The succcession of transfer and application of the tissues of such a flap can vary. The principle advantage of the method is the possibility of covering not less than 2 parts of the face and neck by means of the T-shaped flap.

For the removal of gross cicatricial deformations in the perioral region and the adjacent parts of the face and the neck in combination with defects penetrating into the oral cavity, we proposed a method of plasty using Filatov's flap in the form of duplicature in one of the nourishing pedicles. Such a doubled dermo-adipose band of the flap transferred earlier and fixed by means of one pedicle to the far edge of the defect of the cheek in the middle of intact tissues was used to cover a penetrating defect of tissues by means of plasty of frontolateral walls of the oral cavity: the cheek, part of the lips and chin including the vestibule of mouth. The integrity of the oral cavity was restored, the cicatricial contracture of the lower jaw eliminated (Fig. 3, a—e). At the following stage, pedicle skin grafts cut out from the tissues of the Filatov flap in the region of the cheek were used for the plasty of the tip of the nose and the eyelids, for the elimination of the remaining deformation of the eyelids, the lips, the corners of the mouth and the chin. The thickness of the border part of the lips was achieved by turning the internal lining of the vestibule of mouth outside and applying sutures at the level of the edge of vermilion. The red part of the lips itself was created using grafts from the mucous membrane of a pedicle excised from the internal surface of the intact portion of the lips

Fig. 4a, b. Woman patient E. Combination of defect and deformation in the perioral region and the neck after thermic burn.
a— before, b — after plasty using Filatov's tubular flap

and cheeks (Fig. 3, f—h). As an example, let us present a photograph of the woman patient E. before and after operation (Fig. 4, a, b).

A total of 18 patients were operated by means of the above mentioned methods of plasty using the Filatov tubular flap. In the nearest post operation period, there were virtually no serious complications. Fully satisfactory anatomico-cosmetic and stable functional results were observed in remote periods after operation (from 1 to 14 years). Only in single cases, corrective operations and dermo-abrasion were necessary. Physiotherapy, balneotherapy and medicamental treatment using drugs with lytic effect on scars, therapeutical massage, myogymnastics and mechanotherapy were used in the complex of measures of restorative treatment in varying periods after intervention to prevent complications and relapse of deformations. Modelling compression bandages using various materials were applied.

Our experience over many years with the use of Filatov's tubular flap has thus confirmed the topicality and prospectiveness of this method of skin plasty. Even at present, many problems of restoration of patients with sequels of various burns over the last 15 years, the conclusion has be„en drawn that the fully treated by means of this method. In our Institute, tubular flaps and their varieties — T-shaped and spindle-shaped flaps — have been widely used in repairing complex cicatricial deformations following burns in the lower part of the face and neck, including their combinations with defects penetrating into the oral and nasal cavities. The positive fuctional and cosmetic results obtained by the above mentioned operative methods of plasty with tubular flaps permit us to recommend them for use in clinical practice.

SUMMARY

The method of plasty using the tubular flap proposed by V. P. Filatov is recognized in jaw and face surgery up to the present time. On the basis of experience with 64 patients treated in the Institute of Stomatology for sequels of various burns over the last 15 years, the conclusion has been drawn that the method of plasty using the tubular flap according to Filatov is topical and prospective, and also that it calls for further improvement. A considerable role is assigned to the method in the removal of complex cicatricial deformations of the lower part of the face and neck and also in their combination with defects of the walls of the oral and nasal cavities. The individual methods of operation using the tubular, spindle-shaped and T-shaped flaps are presented. A complex of conservative and restorative measures is used to prevent complications and relapses of deformations. Fully satisfactory cosmetic and functional results were recorded during the folow-up of patients over periods up to 14 years postoperatively.

RESUME

Utilisation du lobe tubulaire de Filatoff dans la réparation des séquelles de vastes brûlures dans la partie inférieure du visage

†Khitroff, F. M., Serguéieff, I. N., Broussova, L. A., Gougnko, V. I.

La méthode plastique proposée par. V. P. Filatoff, qui consiste en utilisation du lobe tubulaire, est hautement appréciée dans la chirurgie des mâchoires et du visage jusqu'à nos jours. S'appuyant aux expériences de 64 cas des séquelles de diverses brûlures, traitées à l'Institut de stomatologie au cours de 15 dernières années, on a conclu que la méthode plastique de lobe tubulaire de Filotoff est actuelle et perspective et qu'elle mérite un perfectionnement ultérieur. La méthode est considérée comme capable de jouer un rôle important dans la réparation de déformations cicatricielles combinées de la partie inférieure du visage et du cou au de leurs combinaisons et de défauts des murs de la cavité buccale et nasale. On allègue des gestes particuliers de l'opération avec utilisation du lobe tubulaire, fuselé et du lobe en «T». Pour prévenir les complications et les récidives de déformations, on a adopté un complexe des mesures conservatives et de rééducation. Durant 14 ans, l'observation des malades après l'opération a confirmé les résultats complètement satisfaisants du point de vue cosmétique et fonctionnel.

Zusammenfassung

Die Anwendung des Filatow'schen schlauchförmigen Lappens bei der Beseitigung der Folgen ausgedehnter Vorbrennungen des unteren Teils des Gesichts

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Die von V. P. Filatow vorgeschlagene Methode der Plastik unter Verwendung eines schlauchförmigen Lappens wird in der Kiefer- und Gesichtschirurgie bis heute anerkannt. Auf Grund der Erfahrungen mit 64 Patienten mit Folgen verschiedener Verbrennungen, die in den letzten 15 Jahren im Institut für Stomatologie behandelt wurden, ist man zu der Schlussfolgerung gekommen, dass die plastische Methode des Filatow'schen schlauchförmigen Lappens aktuell und perspektiv ist, nur muss man sie noch weiter vervollkommnen. Der Methode wird eine wichtige Rolle bei der Beseitigung kombinierter vernarbter Deformationen des unteren Gesichtsteils und des Halses zuerkannt, ebenso wie bei deren Kombinationen mit Defekten der Wände der Mund- und Nasenhöhle. Es werden die einzelnen Operationsmethoden angeführt unter der Anwendung des schlauch- und spinedlförmigen Lappens sowie des Lappens in T-Form. Um Komplikationen und Rezidiven der Deformationen vorzubeugen, wendet man ein Beobachtung der Patienten während einer Zeitspanne bis zu 14 Jahren nach der Operation wurden völlig zufriedenstellende kosmetische und funktionelle Ergebnisse festgestellt.

RESUMEN

Uso del lóbulo tubular según Filatov durante la eliminación de las consecuencias de quemaduras extensas de la parte inferior del rostro

† Khitrov, F. M., Sergueev, I. N., Brusova, L. A., Gun'ko, V. I.

El método de plástica con empleo del lóbulo tubular, propuesto por V. P. Filatov, en la cirugía del rostro y de mandíbula halla aprobación hasta hoy día. En base de las experiencias en 64 enfermos con las consecuencias de diferentes quemaduras, sometidas

al tratamiento durante últimos 15 años en Instituto de Estomatología, fué hecha la conclución, que el método de la plástica por el lóbulo tubular de Filatov es actual y perspectivo, y al mismo tiempo, que es necesario mejorarlo. Al método se le declara un papel importante en la eliminación de las combinadas deformaciones costrosos de la parte inferior del rostro y del cuello, lo mismo y en el caso de su combinación con defectos de paredes de cavidades bucales y nasales. Están presentados distintos métodos de operación con el uso del lóbulo tubular y del fusiforme y del lóbulo en forma T. Con fin de la prevención de las complicaciones y recidivas de las deformaciones se usa el complejo de medidas conservativas y las de la rehabilitación. Durante la vigilación de los enfermos a lo largo de 14 años después de la operación fueron comprobados plenamente satisfactorios resultados cosméticos y funcionales.

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SEVERE POST BURN FLEXION CONTRACTURE OF HAND — A SINGLE STAGE METHOD OF MANAGEMENT

R. S. Thind, A. Singh, M. S. Thind

AETIOPATHOLOGY

Small children most frequently burn the volar surfaces of their hands by grasping or crawling upon hot objects (Peacock, 1977). Usually burns on the volar surface are less likely to be full thickness because skin is thicker on volar surface of hands. However, in deep burns the fundamental problem is loss of skin. Deep pathologic changes are the result of oedema, and immobilization. Important elastic structures such as collateral ligaments of small joints, loose connective tissue around tendons become soaked in protein rich fluid. New collagen forms around the fibrin template and previously gliding surface become incarcinated in non-yielding fibrous cicatrix. Collateral ligaments of MP joints become shortened due to infiltration with unyielding collagen, leading to joint stiffness. Intertendinous adhesions form in flexor tendons. Similar changes may occur in extensor hood and intrinsic muscles. Healing in denuded areas occur by fibrosis and flexion contractures. Healing of the denuded area of adjoining fingers also leads to syndactyly and loss of proper web. With growth, in contracted position, neurovascular bundles and even tendons become short. All these changes, which occur deep to the burn scar, can be prevented or minimised by proper management immediately after burns.

METHODS AND MATERIALS

Forthy-five cases of post-burns flexion contracture of four fingers (and in some cases the thumb also) of hand with variable amount of syndactyly operated upon from 1975 to March 1986, in the Department of Plastic Surgery, Government Medical College/Rajendra Hospital, Patiala (India) are presented.

All were children and majority of them were within the age of 1—5 years.

These were equally distributed in both the sexes. Average duration of contracture was one year and two months. The burns were caused by hot liquids or touching the hot objects or open fire (burning coal). In all the cases there were flexion contractures associated with syndactyly (Fig. 4), but in one case in addition there was extensor contracture at MP and wrist (which was re-

leased first). In the majority of cases, contracture was so severe that finger tips almost touched the palm of hand.

Table 1. Age of patients

Age in years	Number of cases
Below 1	0
1—2	14
3—4	22
4—5	6
5—13	3

OPERATIVE TECHNIQUE

Operation is done under general anaesthesia using inflatable tourniquet. Ethilon 3—0 traction stitches are passed through pulp of finger tips and the nail with the help of stout straight needle (Fig. 1).

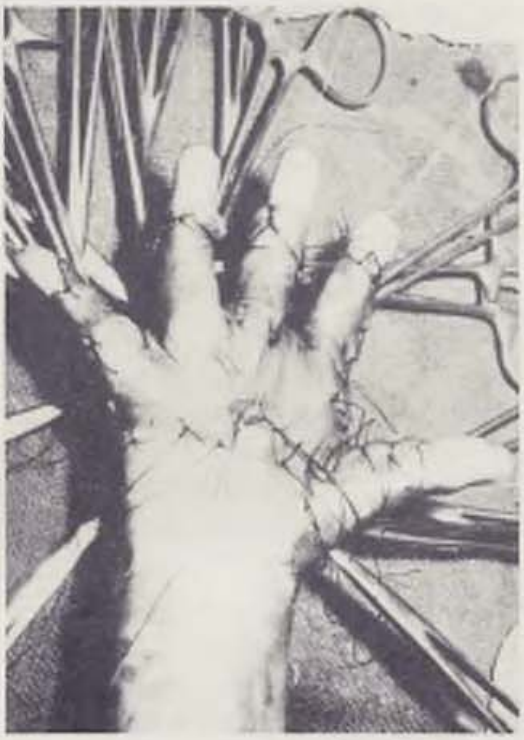

Fig. 1. Release of fingers and thumb flexion contracture and syndactyly using dorsal skin for webs. — Fig. 2. Medium thickness skin graft stitched into the defect after release of contracture

Invariably flexion contracture of four fingers are associated with syndactyly in the web area. Web is created mostly by single dorsal triangular flap of skin (Fig. 1). Sometimes depending on the availability of the tissues both dorsal and palmar flaps or only palmar flap is used. In minor syndactyly cases web is formed by skin which remains attached on dorsal as well as palmar aspect. Flaps are stitched in place with 4—0 eyeless chromic eatgut and 4—0 eyelless Ethilon. Only a few stitches just enough to keep the flap in place are applied.

Contracture of all the fingers is released in single operation as follows:

Traction is applied on the Ethilon stitch of finger to be released first and transverse incision is given on the contracture band on palmar surface. The scar tissue is excised, margins (lateral) of the defect of fingers are made zig zag, upper and lower margins of defect are undermined for a short distance so that finger becomes completely extended (Fig. 1). In some cases anterior capsulotomy of PIP sometimes DIP is required to completely straighten the finger. During this procedure great care is exercised not to damage the vascular pedicles. In none of our cases neurovascular bundles materially obstructed the release of contractures. Tendons were not exposed in any case over any major area. When contracture of all the digits is released tourniquet is deflated to see the adequacy of circulation.

Tourniquet is again inflated and medium thickness split skin graft is applied keeping finger straight and stitches on the lateral margins are taken

Fig. 3. Crammer wire splint with Ethilon threads through finger tips tied to splint. — Fig. 4. Pre-operative photograph showing contracture and syndactyly

superficially enough to avoid damage to the neurovascular bundles (Fig. 2). Tie over dressing is done over all the grafted areas.

The arm is placed in a padded Crammer wire splint. Distal 2"—3" of splint is bent at right angles to the body of the splint. Ethilon traction sutures are tied to one of the transverse bars of the bent part of splint in such a way that fingers remain straight. Now arm is fixed in the splint with the help of crepe bandage which passes through the first web space (so that hand does not slip distally) but not covering the tie over the finger tips (Fig. 3).

Tourniquet is released and circulation is checked. If there is impaired circulation in any finger, bent part of the splint is bent a little more to release the tension of Ethilon on that finger. In most of the cases this is enough to restart the circulation. But in some cases if circulation does not return in spite of this, a few of transversely tied stitches of tie over dressing are cut to release any traction or pressure on vascular pedicle.

POST-OPERATIVE

Routine antibiotics, anti-inflammatory and analgesic drugs in appropriate dosages are given. First dressing is done on seventh or eighth day when tie over dressing and all the stitches are removed. Dressing is done after applying suitable antibiotic ointment. The dressing does not entail the movements of the fingers as Ethilon tied to Crammer wire splint do not allow it (Fig. 3).

Splint and Ethilon traction stitches are removed after 10—15 days and a below elbow plaster of Paris cast is given, keeping the fingers in extension

Fig. 5. Post-operative result in figure 4 case. — Fig. 6. Pre-operative photograph

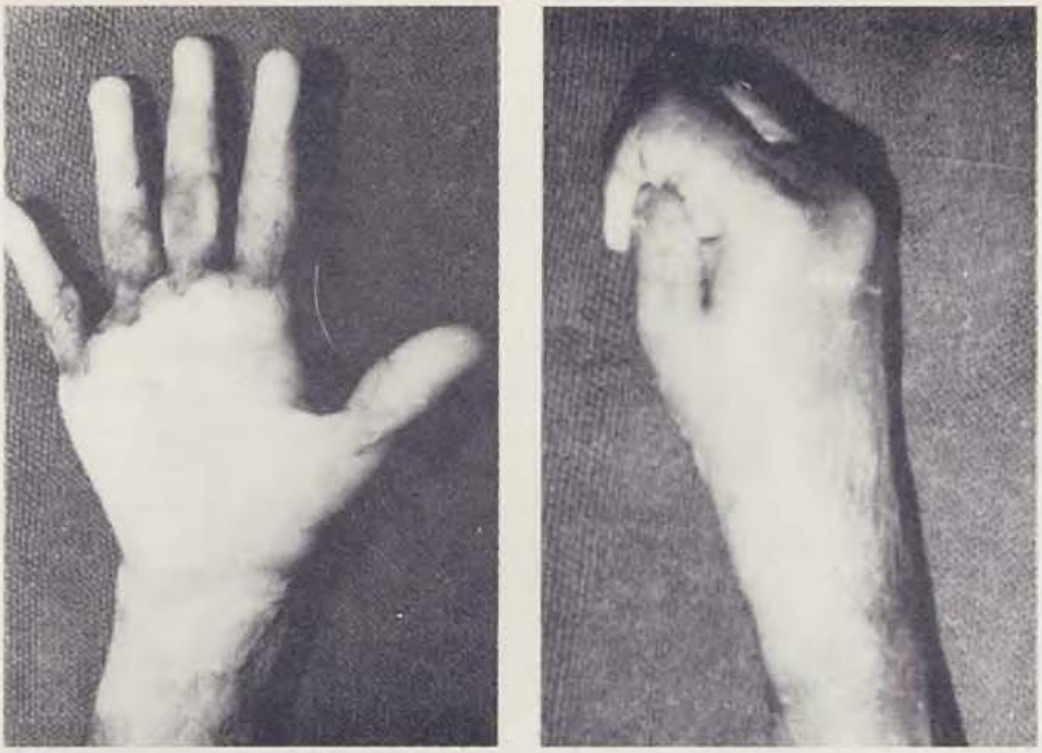

Fig. 7. Post-operative photograph showing full extension of fingers achieved. — Fig. 8. Full function in the same case

Fig. 9. Pre-operative photograph showing contracture of all digits of hand. — Fig. 10. Same case showing full extension of fingers achieved

at all joints, wrist positioned slightly extended and thumb is kept in suitable position (to avoid slipping of the plaster). Arm is supported in a sling.

POP cast is removed after three months. By this time graft has stabilized. Now patient is advised active and passive movements of fingers, and to apply emolient cream on the grafted areas. Normal range of movements are regained in less than one month (Fig. 4—10).

OBSERVATIONS

In children excision of the scar was usually sufficient to achieve full extension of the fingers. There was no excess shortening of neurovascular bundles or tendons and there was manageable joint stiffness. In some children joint stiffness was seen which was corrected by anterior capsulotomy and partial cutting of collateral ligaments. The shortening of neurovascular bundless, joint capsule and collateral ligaments, often seen in prolonged contractures especially in adults, was minimal in children operated early after contracture.

Medium thickness graft is used because it has better chances of take (than thick skin graft) and has less tendency of contraction than thin skin graft. Skin grafts are vastly superior to pedicle flaps due to functional, cosmetic reasons (Smith, 1963) and better sensation. Secondly in such an extensive contracture giving of proper flaps will be a very difficult proposition. Most of the patients being small children, remobilization after prolonged immobilization of fingers in extension for three to four months was not at all a problem. Full range movements at small joints were achieved in less than one month (Fig. 6—8).

RESULTS

Correction of flexion contracture was complete in all, except two cases, with full return of movements in the fingers. In these two cases partial loss of graft had occurred in some fingers due to haematoma where tie over dressing stitches were cut to improve circulation immediately after operation. These cases were reoperated within one year and minor contractures were released and grafted by the same technique with satisfactory results. There is a follow up of 1—10 years showing excellent results and this proves the soundness of this technique of management.

SUMMARY

Management of post-burn flexion contracture and syndactyly of four or even five digits of hand, in forty-five children, is presented. Contracture is released in one stage and raw area is covered by medium thickness split skin graft. Webs are made by dorsal or palmar or both the flaps. Hand is fixed in Crammer wire splint with fingers in extension with the help of Ethilon threads passed through finger tips. After 10—15 days Crammer wire splint is removed and plaster of Paris cast with fingers in extension is applied for three months which is followed by physiotherapy. The cases being children, the joint stiffness has never occurred. Complete movements are achieved within one month

after removal of plaster of Paris cast, using minimal of physiotherapy. Follow up shows excellent results.

RESUME

Grave contracture de flexion des doigts de la main après brûlure — méthode d'opération en un temps

Thind, R. S., Singh, A., Thind, M. S.

Donnée la description de la contracture de flexion après brûlure et de la syndactylie de 4 et même de 5 doigts de la main chez 45 enfants. Aussitôt après relâchement de la contracture, la plaie nue a été recouverte par une peau fendue de l'épaisseur moyenne. Le tissu était prélevé soit du lobe dorsal, soit du lobe palmaire, soit des deux. La main a été fixée sur l'attelle de Crammer en fil de fer, les doigts en position d'extension, à l'aide des fibres d'Ethilon introduites è travers les bouts des doigts. 10—15 jours plus tard, l'attelle de Crammer en fil de fer a été enlevée et pour un temps de trois mois la main restait fixée, les doigts en position d'extension, dans un pansement plâtré. La suite était à la physiothérapie. Comme il s'agissait d'enfants, l'enraidissement d'articulation était nul. La mobilité complète s'est renouvelée un mois après l'enlèvement du pansement plâtré, la physiothérapie étant pratiquée dans la moindre mesure. L'observation ultérieure a confirmé d'excellants résultats.

ZUSAMMENFASSUNG

Schwere Flexionskontraktur der Finger nach schweren Verbrennungen — Die Methode der Einetappenoperation

Thind, R. S., Singh, A., Thind, M. S.

Es wird die Behandlung einer Flexionskontraktur nach einer Verbrennung und einer Syndaktilie von vier und auch fünf Fingern bei 45 Kindern beschrieben. Sofort nach dem Freimachen der Kontraktur wurde die aufgedeckte Wunde mit einer abgespalteten Haut mittlerer Stärke bedeckt. Dieses Gewebe wurde aus einem dorsalen oder palmaren Lappen oder auch aus beiden gewonnen. Die Hand wurde mit einer Crammer'schen Drahtschiene fixiert und die Finger in der Extension unter Anwendung von Äthylonfasern, die durch die Fingerspitzen geführt wurden. Nach 10 bis 15 Tagen wurde die Crammer'sche Drahtschiene abgenommen und die Hand auf drei Monate in der Lage mit ausgestreckten Fingern mittels eines Gipsverbandes fixiert. Hierauf folgte Physiotherapie. Da ja die Patienten Kinder waren, kam es niemals zu einer Gelenkerstarrung. Die völlige Beweglichkeit erneuerte sich einen Monat nach dem Abnehmen des Gipsverbandes bei minimaler Anwendung von Physiotherapie. Die weitere Beobachtung bestätigte die ausgezeichnete Resultate.

RESUMEN

Grave contratura de flexión de los dedos de la mano después de la quemadura — método de la operación de tiempo

Thind, R. S., Singh, A., Thind, M. S.

Está presentada la descripción de la asistencia de la contractura de la flexión después de la quemadura y de la sindactilia de cuatro o aún de cinco dedos de la mano en 45 niños. Inmediatemente después de la liberación de la contractura la herida desnuda fué cubierta por la cútis desintegrada de grueso medido. El tejido fué obtenido

desde el dorsal o del palmar, o de ambos lóbulos. La mano fué fijada por medio de la tablille de alambre de Crammer con dedos en la posición de la extención con ayuda de los filamentos de etileno, introducidos detrás de fines de los dedos. Después de 10—15 días la tablilla de alambre de Crammer fué quitada y a lo largo de tres meses la mano qué fijada en la posición con los dedos extendidos con ayuda de la venda de yeso. Seguía la fisioterapia. Puesto que por enfermos eran los niños, el endurecimiento de las articulaciones nunca tenía lugar. El movimiento pleno se recuperó detrás de un mes después de quitar la venda de yeso en condiciones de uso mínimo de la fisioterapia. La vigilación siguiente confirmó perfectos resultados.

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XXII CONGRESS OF THE EUROPEAN SOCIETY FOR SURGICAL RESEARCH

European surgical researchers, together with some of their American and Japanese collegues, gathered in Aarhus, Denmark, on May 10—13th 1987 to present their latest work. 224 papers were accepted for oral or poster presentation. This review summarizes those which may be of interest to plastic surgeons.

An interesting study in rats was devoted to the role of ischaemia due to low perfusion as an incitor of angiogenesis. Two groups of random pattern skin flaps were raised: first, shorter and very well perfused, as indicated by fluorescein test, and second — longer and reaching well beyond the line of fluorescein staining — predicting a poorely perfused flap tip. Both groups were transferred to distant recipient sites. Ten days later their pedicles were ligated, so that the flap survival depended totally on the new vascular supply from the inset area. Shorter flaps in first group showed a considerably higher incidence of necrosis, as compared to longer, initially poorely perfused flaps in group II. Angiograms of flaps and their attachment areas showed an increased ingrowth of blood vessels crossing the suture line in group II and its absence in group I. The results show that a low perfusion in the attachment area of a flap enhances neovascularization from the recipient bed. This gives experimental evidence for the angiogenesis stimulating effect of delayed division of a distant flap. The perfusion gradient is reversed when well-perfused tissue is brought into an ischaemic recipient bed.

Continues on page 57

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ANTIBACTERIAL CREAMS FOR THE TREATMENT OF BURNS IN INFANTS AND TODDLERS

M. Kudláčková

Burns are serious injuries of childhood threatening children not only in the acute period of burn injury but also in that their lasting consequences may have an adverse effect on their later development.

The rules of burn treatment are very much like the principles of therapy for other traumatic wounds with infection prevention and early wound closure as the main requirements. However, burned tissues are damaged by patches of coagulation necrosis resulting from the effect of heat sources. Thrombosis involving arterioles, capillaries as well as larger vessels causes ischaemia in tissues which then are easily susceptible to colonization my microorganisms (1).

Bacterial contamination of burned areas can be controlled by suitable local therapy. Effective antibacterial preparations can prevent microbial invasion and keep infection from reaching the deeper, intact layers (1, 2, 3, 5). As corroborated by a number of burn centre studies, silver sulfadiazine known under the proprietary names of Dermazine or Silvaden possesses such required properties. Ag-sulfadiazine acts primarily on bacterial cell walls where it triggers off ultrastructural changes. Silver molecules bind to bacterial DNA, thus forestalling their proliferation (1, 5, 11). Dermazin has a fairly broad antimicrobial spectrum as it covers diverse strains of Staphylococcus aureus, Enterobactericeae as well as Candida albicans (1, 3, 5, 6). Our own department has had some good experience with this preparation, too.

MATERIAL

A total of 193 burned children under the age of three were hospitalized at the Department of Paediatric Surgery, Thomayer's Teaching Hospital, Prague 4, in the 1981—1985 period.

The sources of burns in these young children are listed in Table 1. As will be seen, the largest group of our patients were children scalded with hot liquids, specifically 81.9 %. A startling proportion of the children were scalded with hot coffe or tea — 48.7 %! Contact burns caused by sticking hair pins

or wires into uncovered electric sockets amounted to 3.1%. 13.5% suffered thermal burns by touching hot iron, oven or stove. A mere 1.5% of the children suffered caustic chemical burns.

The groups under study were made up of 145 patients with deep — 2nd or 3rd — degree burns. The extent of the burns covered 4 to 35 % of the total body surface (average 12.5 %).

The antibacterial effect of silver sulfadiazine was tested in the treatment of 56 children. The cream was applied for 4 up to 17 days (average 10 days). 89 children constituted the other group of the series. These patients' burned areas were treated with tulle gras supplemented with dressings of 1 ‰ chloramine. All the children had their dressing changed daily.

Table 1. Causes of burns in infants and toddlers
1981—1985

	Absol. number	%	
Coffee / tea	50 / 44	48.7—	81.9 %
Other fluids	64	33.2—	
Heat source	26	13.5	
Electric current	6	3.1	
Chemicals	3	1.5	
Total	193	100	

Table 2. Bacteriological tests of burn wounds before treatment
1981—1985

	Absol. number	%
Number of patients	145	100
Sterile swabs	16	11.0
Bacterial contamination	129	89.0

We evaluated the bacteriological findings from the burn wounds of all the 145 children prior to the treatment by comparison with the results obtained in the course of the therapy. On admission, we found bacterial contamination in 129 children, i.e., in nearly 90% of the total. The precise figures are given in Table 2. Prior to the course of treatment, only 11% had sterile swabs. The most frequently found pathogenic agent — Staphylococcus pyogenes aureus in

a mixed flora — was present in 89% of the children. Contamination with Pseudomonadaceae was detected in 4.5%, Proteus was found in 3.1% of the patients.

Post-therapy bacteriological findings are evaluated in Table 3. In patients treated with silver sulfadiazine, sterile swabs were obtained in 51.8%. The other group of patients treated with tulle gras and chloramine included only 15.7% of children with sterile swabs. In this group of 89 children, there was a clear predominance of bacterial contamination, specifically in 75 children, i. e. in 84.3 %. Again, Staphylococcus aureus in a mixed flora was the principal pathogenic agent.

Table 3. Bacteriological findings after Dermazine treatment 1981—1985

I Dermazine			II Other means	
Total	%	Number of tests	Total	%
56	100	145	89	100
29	51.8	Sterile swabs	14	15.7
27	48.2	Bacterial contamination	75	84.3

DISCUSSION

Great progress has been made in the treatment of burns over the past few years. Broad-spectrum antibiotics, effective local therapy as well as more radical surgery have considerably reduced the burned patients' mortality (1, 5, 9, 10, 12).

Aggregate statistical data supplied by burn centres speak in favour of modern therapy and its successes. In 1964, the death rate in patients with burns covering 50% of the body surface stood at the 50% mark. In 1974, it was down at a mere 30%, and by 1984 mortality for the same extent of burn wounds had dropped to 10% (12).

In spite of that, infection still remains a major problem responsible — in the case of large burns — for the development of dangerous bacterial sepsis (1, 5). In most patients, the onset of bacterial contamination of the burn wound occurs soon after the accident (1, 7, 11). Similarly, the results of the first bacteriological swabs in our own patients corroborated colonization with gram-positive strains in 89% of the children.

Effective local preparations with a broad antibacterial spectrum were sought to control microbial contamination. Since 1963, mafenide acetate (Sulfamylon) has been in use. However, if used too long, it carries the risk of carbon

anhydrase inhibition and acidosis (1, 3). The most widely used antibacterial preparation — 1% silver sulfadiazine (Silvaden, Dermazine) — was devised by Charles Fox back in 1968 (2, 8). As for its side effects, it may lead to hypersensitivity or to neutropenia (2). However, no neutropenia was noted in any of our 56 children treated with Dermazine, a fact reported by other clinical centres, too (1, 3, 5, 10). One of the advantages of this cream is that antisepsis is achieved by virtue of Ag compounds at minimum absorption and low toxicity (5) unlike gentamicin cream with its nephrotoxic and ototoxic side effects.

Effective topical treatment with antibacterial preparations makes for a significant reduction in bacterial infection in burns which do not exceed 50 to 60% of the body surface (1, 3). This view is corroborated by the results obtained at our own clinical department. With Dermazin, sterile swabs were achieved in 51.8% of our young patients.

SUMMARY

The study confirms the importance of the antibacterial effect of silver sulfadiazine tested in the treatment of 56 young children with burns. A comparison is made between bacteriological tests from the burned areas prior to and in the course of the therapy. Treatment with Dermazine reduced bacterial contamination from 89% to 48.2%. In 89 children not treated with Dermazine infection persisted in 84.3%. Effective topical therapy with antibacterial agents is an important part of burned children's treatment.

RESUME

Utilisation de crèmes antibactériennes dans le traitement des nourrisons et des petits enfants

Kudláčková, M.

Le travail témoigne l'importance des effets antibactériens de la silversulfadiazine, attestée dans le traitement des 56 enfants brûlés. Des prélévements bactériologiques des surfaces brûlées, pris avant le traitement et au cours de la guérison, ont été évalués.

Après le traitement par la Dermazine, la contamination bactérienne a baissée de 89% à 48,2%. Dans le groupe des 89 enfants, non traités par Dermazine, l'infection resta chez 84,3% des malades.

Une efficace thérapie locale par des produits antibactériens se présente comme partie importante du traitement d'enfants brûlés.

ZUSAMMENFASSUNG

Die Anwendung antibakterieller Salben bei der Behandlung von Brandwunden bei Säuglingen und Kleinkindern

Kudláčková, M.

Die Arbeit bestätigt die Wichtigkeit der antibakteriellen Wirkung von Silversulfadiazin, das bei der Behandlung von 56 Kindern mit Brandwunden erprobt wurde. Es wurden die bakteriologischen Befunde der verbrannten Flächen vor dem Beginn der Behandlung sowie im Verlauf der Heilung ausgewertet.

Nach der Behandlung mit Dermazin fiel die bakterielle Kontamination von 89 % auf 48,2 % ab. Bei einer Gruppe von 89 Kindern, die nicht mit Dermazin behandelt wurden, dauerte die Infektion bei 84,3 % der Patienten weiterhin an.

Die wirkungsvolle lokale Therapie mit antibakteriellen Präparaten bildet einen wichtigen Bestandteil der Behandlungen von Brandwunden bei Kindern.

RESUMEN

Uso de cremas antibacterianas con fin curativo de niños lactantes y de nenes.

Kudláčková, M.

El trabajo confirma la importancia del efecto antibacteriano de la silversulfadiacina, aprobada con fin del tratamiento de 56 niños quemados. Fueron valorizados hallazgos bacteriológicos de las superficies quemadas antes de empezar el tratamiento y a lo largo del proceso de la curación.

Después del tratamiento por Dermazina la contaminación bacterial disminuyó desde 89% hacia 48,2%. En el grupo de 89 niños, a los cuales no se les sometieron al tratamiento por Dermazina, la infección se sostenía en 84.3% enfermos.

La terapia efectiva local por preparados antibacterianos presenta un componente importante del tratamiento de los niños quemados.

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REHABILITATION IN PLASTIC SURGERY. SIMPLE SPLINTING OF EXTENSOR TENDONS OF THE HAND.

V. Smrčka, M. Kopřivová

The 1st Congress of the International Society for Surgery of the Hand meeting in Rotterdam in June 1980 adopted Verdan's classification of extensor tendon injuries into eight zones (Lee 1984, Tubiana et al. 1984).

Fingers:
- zone 1 — over distal interphalangeal joints (DIP)
- zone 2 — over medial phalanx
- zone 3 — over proximal interphalangeal joint (PIP)
- zone 4 — over the proximal phalanx
- zone 5 — over the metacarpophalangeal joint (MP)
- zone 6 — dorsum of the hand
- zone 7 — below the dorsal retinaculum of the wrist
- zone 8 — distal forearm region

Thumb:
- zone T1 — over the interphalangeal joint (IP)
- zone T2 — over the proximal phalanx
- zone T3 — over the metacarpophalangeal joint (MP)
- zone T4 — over the first metacarpal bone
- zone 7 — below the dorsal retinaculum of the wrist
- zone 8 — distal forearm region

The splinting of injured extensors in the above zones is a necessary complement to surgical treatment as in suitable indications it may, as conservative treatment, produce excellent results without the use of the scalpel.

We present a method for simple splinting using readily available materials. The technique is based on years of experience gathered at the rehabilitation ward of the Department of Plastic Surgery, Brno.

Splinting of the extensor apparatus of the thumb

We use general plaster-of-Paris fixation for post-operative immobilization. However, for post-operative aftertreatment or for the conservative treatment

proper it is necessary to use a removable plaster splint with all the joints of the thumb, including the wrist joint, in hyperextension (Fig. 1a).
Caution:

1. No material other than plaster-of-Paris can be used, none of the available materials is mouldable or strong enough to maintain the right correction position of the thumb.
2. Hyperextension must be maintained until the complete hardening of the plaster splint.
3. The splint must be applied from the volar side.

Fig. 1a. Removable splint for the thumb

The splinting is gradually discontinued while the extensor apparatus is exposed to measured amounts of exercise in the grip direction. At first, the splint is removed for one hour only.

In case of incomplete extension of the distal phalanx of the thumb with the splint removed, we fix the interphalangeal joint with an adhesive tape loop (Fig. 1a). In cases of ruptured dorsal aponeurosis of the thumb we use the same type of splinting (short splint) as in the rest of the digits.

Where the extensor is fixed by a scar over the metacarpophalangeal joint (MP), and thus relatively shortened, we pull it out using a band of rubber (e.g. a 2-centimetre strip cut from a surgeon's rubber glove) fixed to the wrist watch band. The patient should not remove the fixation, he should only release the pull of the rubber band to make sure about the pull of the extensor (Fig. 1b). In cases of overextension and failure to achieve the correct degree of extension, the application of a plaster splint for 1 or 2 hours should do for remedy. Sometimes it will be necessary to combine the rubber band technique with plaster splint positioning.

Splinting for ruptures and abruptions of the distal aponeurosis of fingers (zones 1 and 2)

Mallet or baseball finger is a typical lesion there [Hammerfinger (G), mallet (F), dito a martello (I), martillo (S)]. In the initial phase, a small

Fig. 1b. Elastic traction band to stretch extensor scar-fixed over MP joint

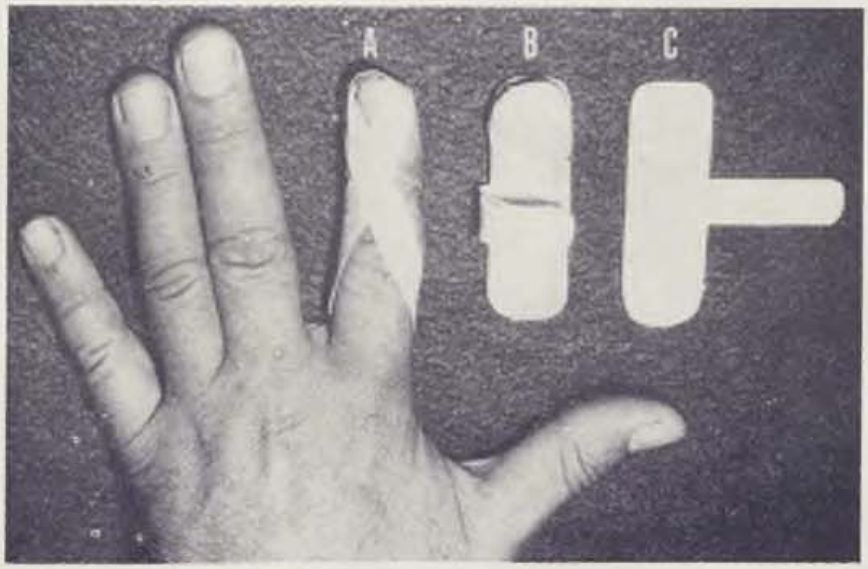

Fig. 2. Permanent immobilization with plastic splint (4—5 weeks), plastic splint (C), plastic splint in shape (B), Spofaplast loop to maintain hyperextension of distal phalanx of finger (A)

plastic splint is applied from the finger tip down all the three phalanges for lasting immobilization, though flexion is possible in the MP joint (Fig. 2). The plastic splint (C) has to be flame shaped to fit the shape of the finger (B).

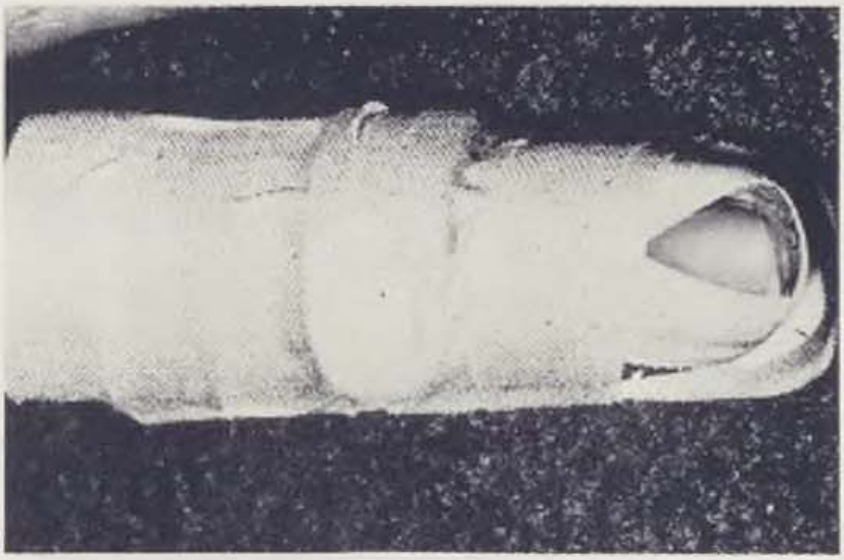

Fig. 3. Splint fixed to finger with turns of Spofaplast tape

Fig. 4. Short removal splint for aftertreatment of distal aponeurosis (5—8 weeks)

The hyperextension position of the distal phalanx is fixed with an adhesive tape loop (A). Then, a band of Spofaplast is wound round the splint and finger for fixation (Fig. 3). The technique was described by Bařinka (1964).

Rehabilitation phase:

After removing the plastic splint (4 to 5 weeks of permanent fixation) we use a short removable splint over the distal two phalanges for aftertreatment. The splint must be the right length to prevent it from moving distalward on PIP joint flexion (Fig. 6).

How to make the splint:

Cut the required length from a veneer sheet, then pad the tip with a wedge of porous foam rubber to achieve hyperextension. Fix the wedge with a strip of adhesive tape 0.5 cm broader than the splint width making sure that the wedge is well covered and fixed to the splint (Fig. 4). The fixation turns of adhesive tape should overlap also the distal interphalangeal joint (see arrow — Fig. 6) to ensure correct hyperextension. To make the splint removable place a strip of mull to that part of the tape which encircles the finger (Fig. 4). This splint is used for intermittent removal and for practising the distal phalanx

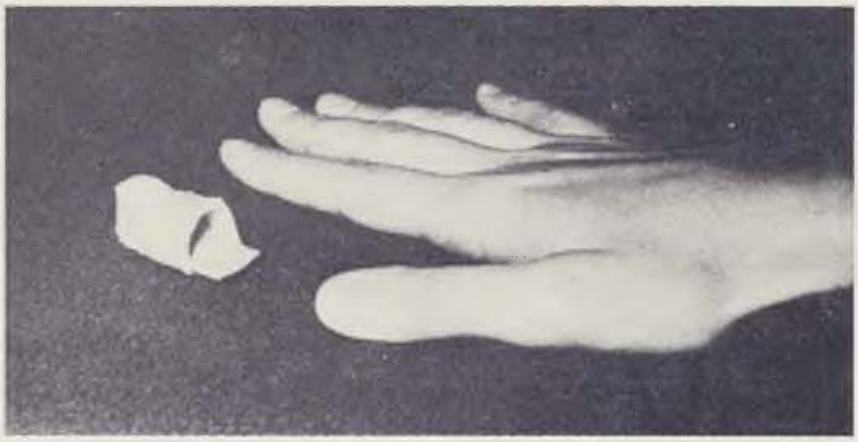

Fig. 5. Short removable splint — ready for application

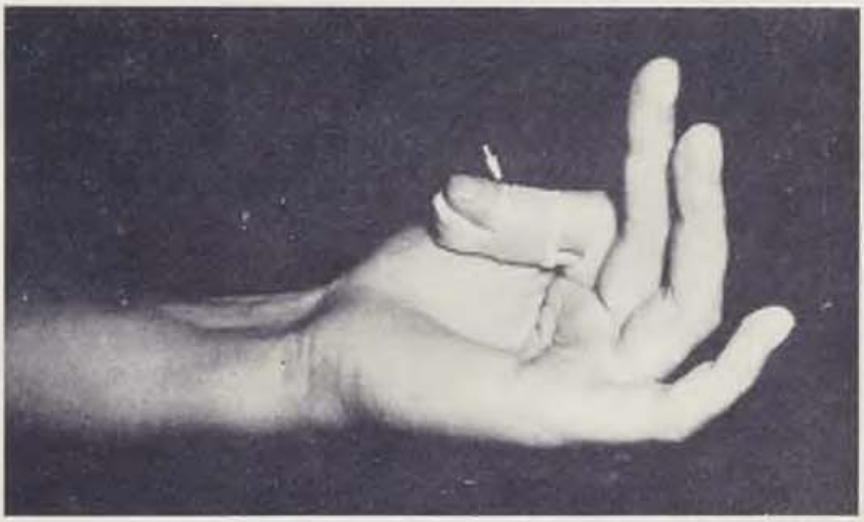

Fig. 6. Short removable splint — correct fixation and splint length

flexion and extension continued until complete restoration of function is achieved (5th to 8th weeks of treatment or longer). The splint is repeatedly put on by pressing the foam rubber pad and turning (Fig. 5).

Disorders of the medial and lateral bands of dorsal aponeurosis (in zones 3—4)

Injury of the medial extensor band and lateral displacement of the side bands lead to typical Boutonnière deformity. [Knopflochdeformität (G), lésion en Boutonniére (F), dito ad asole (I), lesion en ojal (S)]

We can use any type of splint so long as it reaches from the fingertips across the MP joint to the wrist and can be shaped. We have had perfectly satisfactory results using an all-metal splint adapted to the required shape with pliers (Fig. 9).

Caution: The splint must be rigid enough to resist shaping with bare fingers and to retain its shape for prolonged periods of time independently of the body temperature.

There are: I. moderate-degree contractures
a) with distal phalanx hyperextension
b) with distal phalanx flexion
II. fully developed boutonnière contracture with articular tenderness and swelling

ad I. For boutonnière contracture of a moderate degree (Fig. 7) with incipient contracture in the proximal interphalangeal joint (PIP) and hyperextension of the distal phalanx we use a metal splint shaped to copy the con-

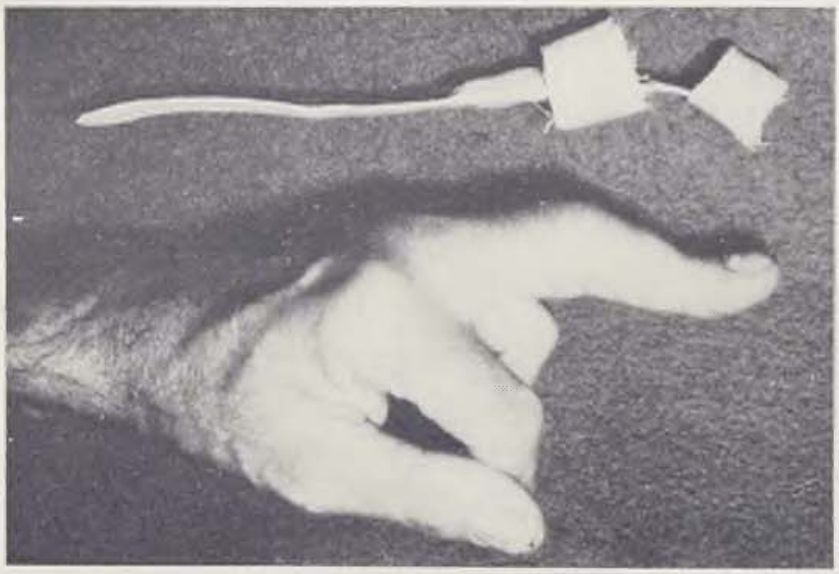

Fig. 7. Moderate-degree boutonnière deformity with splint ready for use. Mull padding between skin and adhesive tape (left in undetached to give a better idea) to ensure removability

tracture to a degree. The distal part of the splint should be bent slightly flexionwise and fixed to the finger with a turn of bandage across the PIP joint. This will simultaneously straighten the contracture. To eliminate contraction hyperextension in the distal phalanx the fixation band should be looser than on the proximal interphalangeal joint (PIP) (Fig. 7, 8). Once the DIP joint hyperextension has been eliminated, we remove the distal band from the splint and make the patient perform active exercise by pressing the distal phalanx to the splint for the correct reposition of the dorsal aponeurosis lateral bands. In cases of moderate-degree contracture with flexion of the distal phalanx the

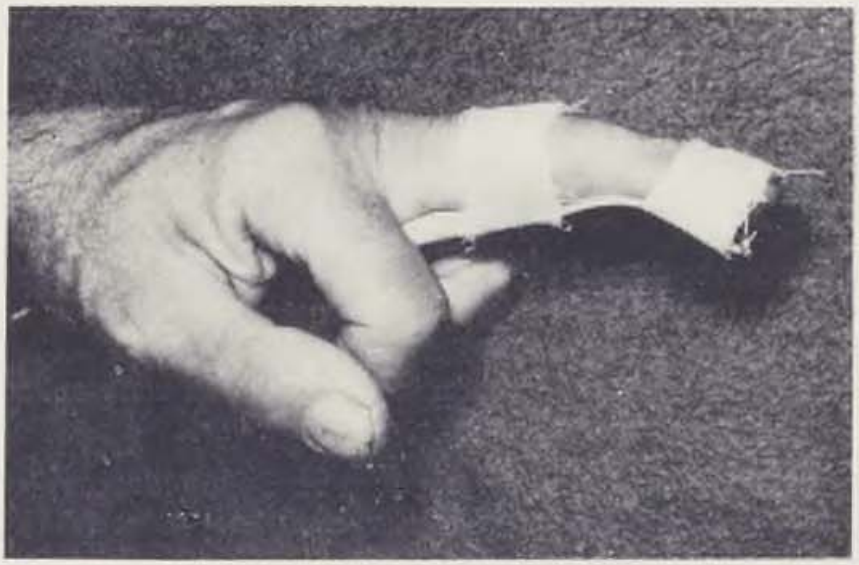

Fig. 8. Correctly applied splint in incipient boutonnière deformity with mull padding undetached

Fig. 9. Pliers with prolonged handles make splint shaping easier

splint should be shaped similarly except that the fixation band is placed solely round the PIP joint with the distal phalanx remaining free (Fig. 9, 10).

Gradually, as the contracture becomes strainghtened out we also straighten the splint under the DIP joint until it is completely straight (Fig. 11).

ad II. In cases of fully developed boutonnière contracture with the joint tender and swollen we again just roughly copy the contracture. The MP is supported by a plastic foam pad, the thickness of which remains unchanged throughout the course of treatment. The thickness of the other pad between the splint and the medial phalanx changes in proportion to the strainghtening of the contracture.

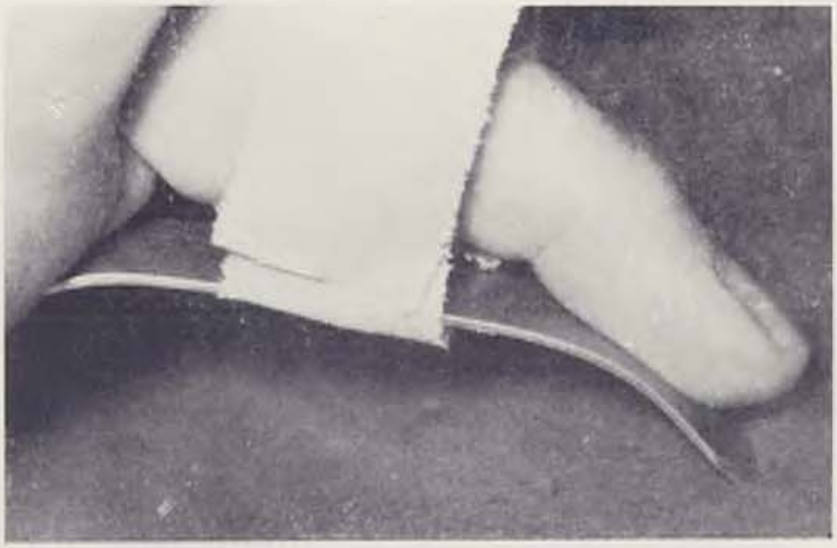

Fig. 10. Splint shaped to fit the finger, with slightly bent distal part

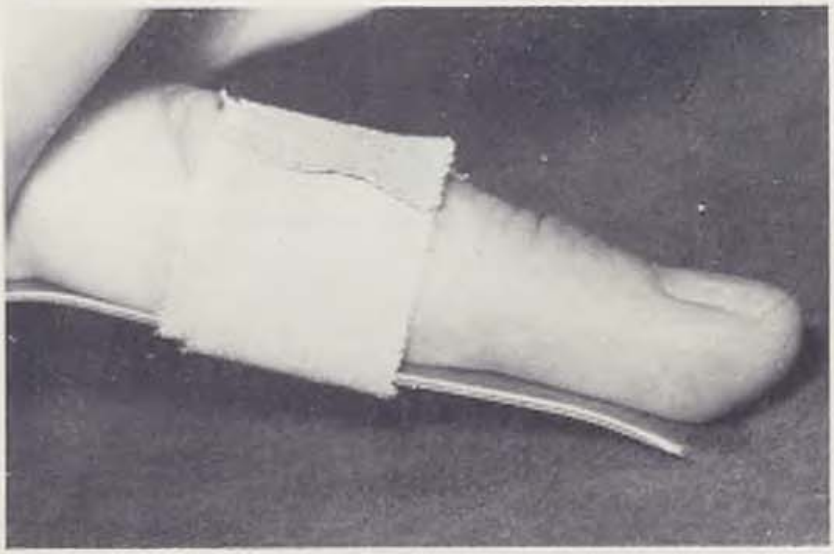

Fig. 11. Splint and contracture straightening

Another frequent condition open to conservative treatment in this region is swan-neck deformity [Schwanenhals deformität (G), col de cygne (F), cuello de cisne (S)]. This results from disorders co-ordination of the extensor and flexor apparatuses due to a number of factors with the lateral bands of aponeurosis coming close to the central band. There is hyperextension in the PIP joint, and later also a flexion position in DIP.

To straighten out the hyperextension we use a metal splint extending over all the three phalanges. The splint is fixed to the finger in the proximal and distal phalanges and shaped so as to keep the PIP joint in semiflexion. The splinting is maintained for a long time, a number of months. For aftertreatment, to maintain the required position, we can use a short plastic or metal splint to keep the PIP joint in semiflexion; the splint is fixed in the vicinity of that joint.

Radial or ulnar deviation resulting from unilateral damage to the extensor or even articular apparatus (PIP) is the third possible lesion. For its straightening we use a rigid trough-shaped splint to maintain the finger in axial alignment and in extension. Using the cardboard from a shotgun cartridge proved to be the best approach in our experience (Fig. 12, 13).

Fig. 12. Splint adjustment for axial finger alignment, padded with foam rubber on the inside and wrapped in adhesive tape

Extensor disorders on the dorsum of the hand and over MP joints (in zones 5 and 6)

We use the conservative approach for:

a) partial defect of proximal phalanx extension with extension of the distal phalanges preserved,
b) fixation of extensors in scars over metacarpals

ad a) This disorder may be due to the extensor scar being pulled out at suture site following the premature removal of plaster fixation, or to the extensor apparatus overloading as a result of the forceful practising of the grip.

We can use a metal splint, a plaster splint or Kramer's splint for the purpose. We apply the splint from the volar side. The splint extends from the fingertips down to the proximal third of the forearm to maintain hyperextension in MP joints and alignment in the interphalangeal joints. We leave it in position until we can perform a test hyperextension in the MP joints (approximately in 1 to 5 weeks).

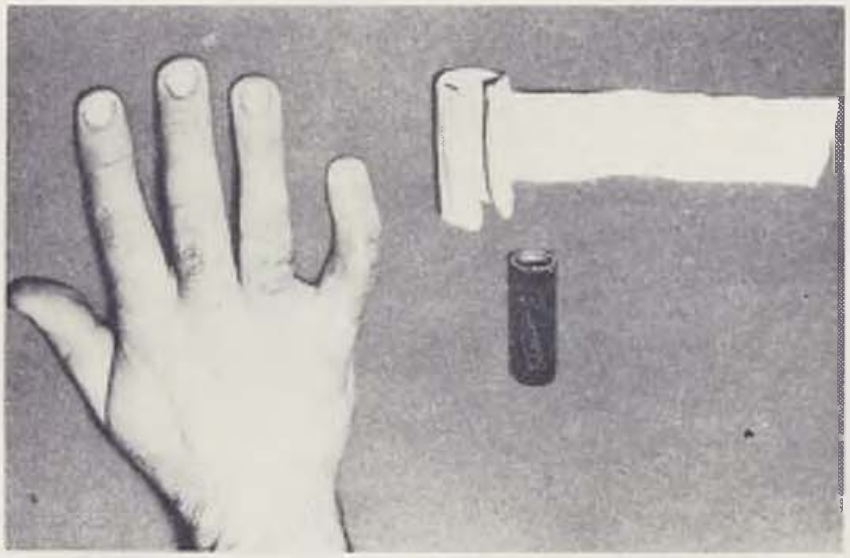

Fig. 13. Splint in position for finger alignment

ad b) With extensors adhering to the epimetacarpal scar there is no flexion in the MP joint and limited flexion in the interphalangeal (IP) joints (Fig. 14).

To stretch the extensor scar we use MP joint flexion or also IP flexion pulling to a cuff on the wrist making sure that the wrist itself is firmly fixed. We attach a volar plaster splint extending from the MP joints down to the proximal third of the forearm (Fig. 15). The wrist cuff is fitted with hooks, to which the finger is pulled by elastic bands (Fig. 16). Rubber bands cut off from surgeon's gloves proved useful for the purpose. In case of rigidity in the MP and IP joints, the traction can be increased by means of a glove with one traction band attached to the tips of the glove fingers, another to the PIP joint, and a third to the proximal phalanx. The number of traction bands can be changed to need (Fig. 17).

Caution: In this type of splinting it is essential to keep an eye on the extensor function. In cases of inadequate function (decrease) splinting with volar splints extensionwise must take turns with traction flexionwise and with active conditioning of extensors.

Fig. 14. Contracting scars of extensors over metacarpal bones. — Fig. 15. Preparations for splinting

Fig. 16. Plaster splint with cuff and traction at MP joint. — Fig. 17. Increasing the traction with a glove in rigid MP and IP joints

Disorders of extensors over the wrist and the distal part of the forearm (in zones 7 and 8)

For the post-operative aftertreatment of ruptured extensors in the wrist and the distal portion of the forearm it is useful to apply a plaster splint or full plaster bandage extending from the fingertips down to the proximal third of the forearm to maintain extension in the wrist and alignment in the IP joints. The angle of extension should be estimated by the other hand. Excessive hyperextension causes pain in the wrist joint, which is why after a week or so the fixation should be transferred to wrist level. The splint ought to be left in position for 6—8 weeks with gradual intermittent removal and repeated extensor function tests.

For congenital ulnar and radial deviation in the wrist with anomalous extensor traction we use, first, a volar plaster splint reaching from the metacarpophalangeal joints down to the proximal third of the forearm to keep the hand aligned with the forearm. Since such splinting has to be applied for several years in between the particular phases of operation, we use a lightweight plastic splint in place of the heavy plaster splint. The splint is designed to maintain the right position in the wirst, and reaches only as far as the MP joints to permit movement in IP joints and flexor tendons exercise. In case of deformities with smaller traction in deviation a splint from the dorsal side can also be used (Fig. 19).

Fig. 18. Result of the stretching of extensors fixed in scar. — Fig. 19. Splint to maintain position in the wrist (moderate traction of extensors in deviation)

CONCLUSION

The advice listed here is based on years of empirical practice and should be seen merely as "directions for use". Each patient with extensor tendon injury requires a strictly individual approach.

SUMMARY

The authors report on a simple technique of splinting for the conservative treatment of disorders of the extensor apparatus of the hand. They describe splinting of the thumb, splinting in lesions of the distal aponeurosis of the fingers, in disorders of the central and lateral bands of the dorsal aponeurosis, and in lesions over the metacarpophalangeal joints and metacarpals. The methodology of the making and application of the splints is included.

RESUME

Rééducation en chirurgie plastique. Attelles simples des tendons extenseurs de la main

Smrčka, V., Kopřivová, M.

Le travail démontre l'utilisation d'attelles simples dans le cadre du traitement conservatif des troubles d'appareil extenseur de la main. On décrit la pose d'attelles pour le pouce, pour des lésions de l'aponévrose distale des doigts, pour des troubles des stries médiannes et latérales de l'aponévrose dorsale et pour des lésions situées au-dessus des articulations métacarpophalangiennes ou métacarpiennes. La préparation et la pose d'attelles sont introduites d'une manière méthodique.

Zusammenfassung

Die Rehabilitation in der plastischen Chirurgie. Das einfache Verschienen der Strecksehnen der Hand

Smrčka, V., Kopřivová, M.

Die Arbeit beschreibt das einfache Verschienen im Schema einer konservativen Behandlung von Störungen des Streckapparats der Hand. Es wird das Verschienen des Daumens, das Verschienen einer Läsion bei distaler Aponeurosis der Finger, bei Störungen der mittleren und sitlichen Zonen bei dorsale Aponeurosis sowie bei einer Läsion über den metakarpophalangealen Gelenken und dem Metakarpus beschrieben. Die Vorbereitung und das Anlegen der Schienen wird in methodischer Weise angeführt.

RESUMEN

Rehabilitación en la cirugía plástica. Simple tratamiento por tablillas de los tendones extensores de la mano.

Smrčka, V., Kopřivová, M.

En el artículo está presentado un simple tratamiento por tablillas en el esquema del tratamiento conservativo de los defectos del aparato extensor de la mano. Está descrita la técnica del tratamiento por tablillas del pulgar, de las lesiones de la apo-

neurosis distal de los dedos, de los defectos de las medianas y las laterales cintas de la aponeurosis dorsal y de las lesiones más arriba de las articulaciones metacarpofalangealles y de metacarpos. Metódicamente está descrita la preparación y la aplicación de las tablillas.

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Continues from page 38

Yet another attempt was made to explain delay phenomenon in flaps. Within few minutes after incision bleeding stopped at the wound margin, but vessels along the wound dilated. Flow was rerouted and increased along the wound margin and new vessels (angiogenesis) were seen in increasing numbers from day 5 on. Increasing flow along the wound margin was seen until about day 14 and decreased thereafter. Rerouting of blood flow and angiogenesis due to injury and repair probably account for a significant portion of the delay phenomenon and deliver a possible explanation for the increased oxygen delivery.

A study on tissue oxygen tension in random pattern skin flaps during normovolemic hemodilution concluded that a compensatory increase of cardiac output outweighed the loss of oxygen carrying capacity of blood. In another study, the effect of normovolemic hemodilution with Dextran from 50 % to 29 % mean hematocrit value on tissue perfusion was tested in a newly developed easy-access ear flap model. Repeated vital microscopic observations were made of the capillary network, so as to determine the percentage of non-perfused tissue at 1, 6 and every 24 hrs thereafter. The hemodiluted group presented significantly less amount of non-perfused tissue, the greatest difference being achieved at 120 hrs.

The value of standardized photoelectric technique of skin perfusion pressure measurements as a guidance to amputation level selection was also tested. Healing rate in regions with pressure over 40 mm Hg was c. 90 %, but only 50—60 % with pressure 20 mm Hg or less. This method can replace the redioisotope washout as a routine guidance to level selection.

Continues on page 62

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DORSAL HAND INJURY REPAIR WITH VASCULARIZED TENDON GRAFT USING A RADIAL FOREARM FLAP — CASE REPORT

J. Podlewski, M. Opolski, L. Jankiewicz

Injuries of the dorsum of the hand often result in major soft tissue destruction. Reconstruction in such cases often requires multi-stage operations over a considerable length of time. Traditional reconstruction includes débridement, skin flap transfer and subsequent tendon grafts with several months or week between each stage.

We have succeeded in achieving soft tissue coverage and extensor tendon repair with a method which does not require microvascular anastomosis. This method of treatment has helped to reduce the number of surgical interventions, thus minimizing the problems of scarring and soft-tissue contracture (1, 2, 3, 4). The method makes use of a distally based fascio-cutaneous island flap from the forearm complete with the palmaris longus tendon (1, 4). This vascularized tendon was used for the reconstruction of the extensors of the fingers.

CASE REPORT

A 39-year old woman sustained contusive thermal injury of the left hand. There was a contused wound and a 3rd-degree burn of the skin over the dorsum of the hand. Débridement followed in three days' time, and the resulting defect, 12 by 12 cm in size, was covered with a split- skin graft. Subsequently, the dorsal skin, including the graft, became necrotic and demarcated with damage affecting also the extensor tendons of the index and middle fingers. Angiography and the Allen test showed the presence of adequate ulnar artery supply to the injured hand. Forty days later, the injured hand was redébrided and the distally based forearm fascio-cutaneous island flap with the palmaris longus tendon was mobilized. The distal portion of the vascular pedicle was mobilized down to the anatomical snuff-box. The palmaris longus tendon was used for tendon grafting. The fascio-cutaneous flap was sutured to the end of the dorsal skin graft. A volar splint was applied. In the post-operative period, the flap became oedematous, otherwise, the healing process was

uneventful. Eight week after the repair, the patient was able to resume work on her farm.

It is not often that rapid mobilization and definitive reconstruction can be accomplished after a severe hand injury. This can lead to soft-tissue fibrosis, tendon adhesion, and contractures of joints, and thus jeopardize the ultimate

Fig. 1. Contusive thermal injury of the dorsum of the hand before reconstruction

Fig. 2. A distally based forearm island flap at the site of injury. Reconstruction of extnesor tendons

result. The traditional method of treatment is one of conventional flap repair with delayed tendon grafting. The use of a distally based radial forearm flap incorporating the palmaris longus tendon permits local one-stage reconstruction dispensing with microvascular anastomosis. A well vascularized tendon offers the advantage of rapid healing and fewer tendon graft adhesions to the recipient bed. This approach to reconstruction minimizes the danger of fibrosis and stiffness, while maximizing the chances of a good fuctional result.

Fig. 3, 4. Final result following surgical treatment

SUMMARY

The authors report on a patient with a large soft-tissue defect on the dorsal surface of her hand. The surgical treatment included débridement of the dorsal wound and one-stage reconstruction using a distally based forearm fasciocutaneous island flap incorporating the palmaris longus tendon. The final result was satisfactory.

RESUME

Reconvrement de la plaie sur le dos de la main par une greffe teudieueuse vascularisée, avec l'utilisation du lobe radial de l'avant-bras

Podlewski, J., Opolski, M., Jankiewicz, L.

Description d'un cas d'un malade avec un grand défaut de tissus mous sur le dos de la main. Le traitement comportait l'excision et le nettoyage de la plaie, après quoi on a immédiatement effectué une reconstruction, à l'aide d'un lobe fasciocutané en forme d'îlot qui comprenait le palmaire long (palmaris longus). Le résultat final est satisfaisant.

ZUSAMMENFASSUNG

Das Bedecken einer Wunde auf dem Handrücken mit einem vaskularisierten Sehnenpfropfen unter Anwendung eines radialen Lappens aus dem Unterarm

Podlewski, J., Opolski, M., Jankiewicz, L.

Es wird ein Patient mit einem grossen Defekt des weichen Gewebes auf dem Handrücken beschrieben. Die chirurgische Behandlung umfasste Exzision und Säuberung der Wunde sowie sofort darnach eine Rekonstruierung mittels eines distal angelegten inselartigen Fasciolappens, der eine Sehne palmaris longus enthielt. Der hieraus resultierende Zustand war befriedigend.

RESUMEN

Cubrimiento de la herida del dorso de la mano por la hendedura tendinal vescularisada con el uso del lóbulo radial del antebrazo.

Podlewski, J., Opolski, M., Jankiewicz, L.

Está presentada la descripción del enfermo con un gran defecto de tejidos blandos en el dorso de la mano. El tratamiento cirujano incluía la excisión y la purificación de la herida e inmediatamente la reconstrucción con ayuda del distalmente fundado lóbulo fasciocutáneo de islote, que contenía tendón palmaris longus. El estado resultante fué satisfactorio.

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Continues from page 57

The study on microvascular changes following prolonged "turniquet" ischemia in skeletal muscle showed that reperfusion injury after 4 hrs is characterized by decreased functional capillary density, heterogenous capillary perfusion, reduced erythrocyte velocity in capillaries and collecting venules, and tissue hypoxia. The role that leukocyte-endothelium interaction plays in impairing capillary flow is at present under investigation.

A Laser-Doppler velocimeter was tested in monitoring the perfusion in a free skin flap in rat, and found equally efficient as monitoring of skin temperature. Indeed, the author of this review cannot refrain himself from a bitter comment, that much effort in plastic surgery research is devoted to the invention of more and more sophisticated machinery to distinguish the flap that is obviously dying from those that survive perfectly well.

An interesting study was aimed at reducing the thrombogenecity of artificial vascular grafts. Human sphenous vein endothelial cells were harvested enzymatically by collagenase, cultivated in medium containing endothelial cell growth factor and seeded onto synthetic grafts preclotted with fibrin glue or covered with collagen. Several tests confirmed thereafter that in vitro lining of artificial vascular grafts resulted in an instant and stable endothelial cell coverage of the prosthesis.

Electrical stimulation has a favourable effect on healing of bone and some types of nervous tissue. An attempt was made to study its effect on healing of incisional skin wounds in rats. It was concluded that both direct and sinusoid current stimulation resulted in a significant increase of the collagen content in and around the wound, however, no difference was found in mechanical strenght of the wound.

Interleukin 1 (IL-1) stimulates fibroblast proliferation and augments lymphocyte response to alloantigens, therefore its eventual presence in the skin might play a role in wound healing and scar formation, as well as in enhancing immune reactions in

a skin allograft. A detailed study in man confirmed for the first time that normal skin tissue fluid and lymph possess IL-1 activity which is not found in serum. The main source of the lymphokine is epidermal but not migrating lymph mononuclear cells. The actual role of skin IL-1 remains to be further investigated.

Detrimental effect of steroids on wound healing is well established. Specific effect of methylprednisolone (fall in the accumulation of nucleic acids, collagen and glycosaminoglycans) was abolished by a daily local application of epidermal growth factor (EGF).

The effect of human fibrin sealant on wound healing in rabbits was tested, as compared to completely uncovered wounds. The results indicated that the sealant had a protective effect over large open wounds, although since the degradation and absorption of the glue took place every 7—10 days, it should be spread over the wound every 6—7 days. Again, the reviewer's bitter comment is that we all know that any wound coverage is better than none, and the real value of the sealant could be tested only when compared to another biological wound dressing.

The possibility of using allogeneic tissues in reconstruction is always attractive. A study aimed at investigating the effects of cryopreservation on the antigenicity of bone showed that no substantial reduction of antigenicity can be expected. On the contrary, bone is able to induce cell-mediated immune response.

Cyclosporine (CsA) marks a new era in clinical organ transplantation and its potential use in reconstructive procedures deserves proper attention. One in six allogenec hand transplants in baboons survived almost 300 days using CsA and prednisolone immunosuppresion. Histology and electrophysiology studies demonstrated good nerve regeneration. X-ray studies showed that bone healing equalled normal fracture healing. Mild symptoms of chronic rejection, as seen in light microscopy, were most prominent in the skin, but scarce or absent in muscle or nerve tissues. The hand developed good overall functional recovery and was actively used by the baboon. Apparently, hand allotransplantation can have clinical application if problems of rejection, especially of the skin can be overcome.

The author of this review reported indefinite survival of rat skin allografts using low, non-toxic maintenance doses of CsA, and described some elements of the impaired immune response. Cellularity and proliferative capacity of lymphocytes in regional lymph nodes were reduced. Potent T helper activity seen in untreated animals was profoundly depressed, additionally, T suppressor activity was noted soon after grafting and observed throughout maintenance phase. Adoptive transfer of lymph-node lymphocytesapparently with predominant suppressor characteristic) into naive recipients prolonged survival of donor-specific, but not third-party test cardiac allografts. In situ, CsA prevented the thrombotic occlusive microvascular injury shown to be critical in graft rejection. This was associated with diminished numbers of T cytotoxic lymphocytes and natural killer (NK) cells within the graft, but most importedly, with the lack of expression of a macrophage membrane activation antigen, defined for the first time by the monoclonal antibody A1—3, and linked with development of macrophage procoagulant activity.

In summ, XXIInd Congress showed the wide scope of studies performed currently by the Members of the Society, and reflected well the varied standards of surgical research in Europe.

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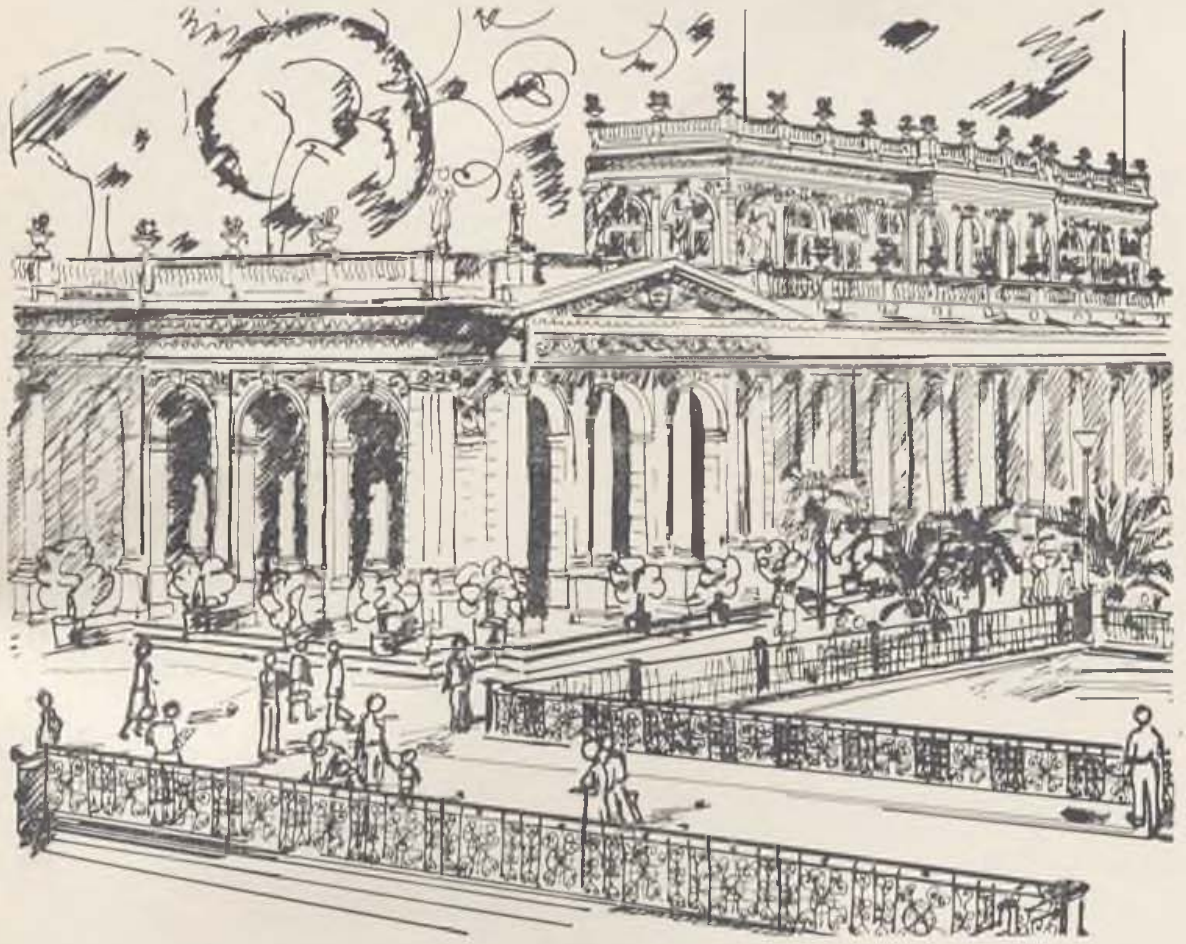
CONTENTS

STOP FOR A MOMENT AND CONSIDER YOUR HEALTH



DAY AFTER DAY AND YEAR AFTER YEAR YOU ARE CONSTANTLY CHASING SOME AIM OR ANOTHER, YOU STRETCH THE MAINSPRING OF YOUR HEALTH TO THE VERY MAXIMUM. AND HOW LONG DO YOU THING YOU CAN CONTINUE TO DO SO? REMEMBER THAT YOU HAVE ONLY ONE HEALTH AND FINALLY MAKE UP YOUR MIND TO GRANT IT, AT A VERY REASONABLE PRICE, WHAT IT DESERVES: COMPLEX TREATMENT AT ONE OF THE OLDEST AND THE MOST WIDELY RECOGNIZED SPAS IN EUROPE.

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