F.C.S.(S.A.) WITH PLASTIC AND RECONSTRUCTIVE SURGERY

PART III

CANDIDATE: DR. L. BERKOWITZ

ANALYSIS OF PRACTICAL SURGICAL EXPERIENCE

AND

CASE REPORTS

1977

TO LINDA

PREFACE

In producing this book, I have had no precedent to guide me as to the best means of satisfying my examiners' requirements.

In the case reports, I have attempted to cover what I feel are the important aspects of each case, and to discuss the topic not only in the light of what I have read in the literature, but also keeping always in mind the teaching and advice of those senior colleagues who have been responsible for introducing me into the fascinating art of Plastic Surgery.

From the beginning of my training in Plastic Surgery, I have attempted to keep an accurate record of all the cases with which I have been associated. I believe that I have succeeded to a large extent, and if there are any deficiencies, they are in the record of the cases in which I did not play a very active roll i.e. where I was observer or assistant.

These cases have been collected over a long period of time, and have been recorded photographically by me using a simple Kodak Instatech camera. For obvious reasons, the pictures were all taken as colour slides.

When it became necessary to produce photographs for this book, the matter was complicated by having to produce black and white prints from the slides.

The means that I have chosen of presenting the pictures, on document paper, has not produced the result I would have liked, and for this reason I have added the black and white prints, which give greater clarity of detail, in an Appendix.

The only topic which I have failed to cover in the case reports is that of malignancy of the body and extremities. Although I have dealt with a number of minor cases, I felt that I did not have a suitable case for a case report.

Dr. L. Berkowitz.

CERTIFICATE OF SERVICE

This is to certify that Dr. Leslie Berkowitz has worked as a Registrar in the Department of Plastic Surgery at Groote Schuur Hospital and the Red Cross War Memorial Children's Hospital since 1st June, 1974.

During this time he has been exposed to a wide spectrum of pathology concerned with Plastic and Reconstructive Surgery.

He has been given ever-increasing responsibility in the management of cases, and has carried out most operations which I consider to be essential in the training of a Plastic and Reconstructive Surgeon.

In addition to his duties in the Department, he has attended the Hand Clinic which is run by Drs. Martin Singer and Cecil Bloch. Under their guidance, he has carried out a fair spectrum of operations upon the hand.

He has also spent considerable time at private clinics in Cape Town, observing and assisting Drs. David Davies and Bertram Binnewald with operations on their private patients, thus exposing himself to a greater experience of cosmetic surgery than he would have been able to obtain at Groote Schuur Hospital alone.

In my opinion, he has had sufficient training to enable him to sit the Final Examination for the F.C.S. (S.A.) with Plastic and Reconstructive Surgery.

Signed

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I N D E X

ANALYSIS OF PRACTICAL SURGICAL EXPERIENCE.

ANALYSIS OF PRACTICAL SURGICAL EXPERIENCE

Since starting my training in Plastic Surgery, I have attempted to keep an accurate record of all the cases I have performed myself, and those at which I have assisted or observed.

Hopefully this record is complete, but if not, it errs on the conservative side.

I have divided the cases into those performed by me as Surgeon, Assistant or Operating Assistant. The latter indicates when I assisted a Consultant at an operation where two symmetrical parts of the body were operated on at one time, one by the Consultant and one by me.

PAEDIATRIC PLASTIC SURGERY:

1. Cleft lip:

Primary repair

Surgeon: 5 cases
Assistant: 6 cases

Secondary repair

Surgeon: 8 cases
Assistant: 2 cases

2. One Stage Repair of Complete Left Lip and Palate:

Surgeon: 1 case
Assistant: 10 cases

3. Cleft Palate:

Primary repair

Surgeon: 20 cases
Assistant: 8 cases

Repair of Fistulae

Surgeon: 3 cases
Assistant: 2 cases

4. Pharyngoplasty:

Surgeon: 6 cases
Assistant: 4 cases

5. Secondary Correction of Cleft Lip Nose Deformities:

Surgeon: 5 cases
Assistant: 4 cases

6. Columella Lengthening:

Surgeon: 3 cases

7. Late Bone Graft to Maxilla:

Assistant: 1 case

8. Repair of Bilateral Macrostomia:

Assistant: 1 case

9. Tongue tie:

Surgeon: 8 cases

10. Preauricular Sinuses and Skin Tags:

Surgeon: 10 cases

11) Bat Ears:

Surgeon: 2 cases
Assistant: 3 cases

12) Cystic hygroma of chest wall:

Assistant: 1 case

13) Hypospadias:

Meatotomy — Surgeon: 6 cases; Assistant: 5 cases

Primary repair — Surgeon: 5 cases; Assistant: 8 cases

Secondary repair — Surgeon: 3 cases

14) Epispadias:

Assistant: 1 case

15) Circumcision:

Surgeon: 10cases

16) Syndactyly:

Surgeon: 3 cases
Assistant: 2 cases

17) Amputation of Extra digits:

Surgeon: 20 cases

18) Lobster claw hand:

Assistant: 1 case

19) Meningomyelocele - Flap repair:

Surgeon: 3 cases
Assistant: 1 case

20) Ear Reconstruction - Congenital and Post-traumatic:

Local and Neck Tube Pedicles for Partial Reconstruction of the Helix.

Surgeon: 8 cases

21) True Hermaphrodite:

I was fortunate to be able to be associated with this unusual case and assisted at the initial reconstructive surgery.

This included excision of breast tissue, release of chordee, hysterectomy and biopsy of the gonad on the right which was a testis on histology.

B U R N S

Treatment of Acute Burns:

Skin Graft — Surgeon: 175 cases

Tangential Excision and Skin Graft — Surgeon: 26 cases

Treatment of Burn Scars and Contractures:

Scars:

Revision of scars and skin graft — Surgeon: 6 cases

Revision of scars by simple excision or flap repair — Surgeon: 14 cases

Nipple Reconstruction in burn scar:

Surgeon: 1 case

Contractures:

This includes contractures of hands, cubital fossae, axillae and neck.

Release of contracture and split-thickness or full-thickness skin graft:

Surgeon: 72 cases

Release of contracture and flap repair:

Surgeon: 49 cases

PLASTIC SURGERY OF THE HAND:

1) Fingertip injuries, laceration of hand and forearm:

Treated by:-	Suture	Surgeon: 27 cases
	Split skin graft	Surgeon: 31 cases
	Local flaps	Surgeon: 5 cases

2) Fractures of the fingers:

Closed reduction	Surgeon: 10 cases
Open reduction	Surgeon: 8 cases

3) Septic Fingers and Hands:

Incision and Excision under general anaesthesia and tourniquet control.

Surgeon: 33 cases

4) Secondary repair of severed nerves, including digital nerves and median, ulnar and radial in the palm, at the wrist and as high as the elbow:

Surgeon: 7 cases
Assistant: 10 cases

5) Flexor Tendon Grafts:

Surgeon: 9 cases
Assistant: 9 cases

6) Secondary Repair of Flexor and Extensor Tendons:

Surgeon: 3 cases
Assistant: 5 cases

7) Primary Repair of Flexor Tendons and Nerves:

Surgeon: 8 cases
Assistant: 1 case

8) Primary Repair of Extensor Tendons:

Surgeon: 15 cases

9) Primary Debridement and Suture or Skin Graft of Severely Crushed or Lacerated Hands:

Surgeon: 17 cases

10: Tendon Transfer:

Assistant: 1 case

11) Flexor Tenodesis:

Surgeon: 2 cases
Assistant: 2 cases

12) Amputation of Fingers:

Surgeon: 7 cases
Assistant: 2 cases

13) Trigger Finger and Thumb:

Surgeon: 2 cases
Assistant: 1 case

14) Dupuytrens Contracture:

Assistant: 4 cases

15) Valgus Deformity of Thumb:

Assistant: 2 cases

16) Tumours of the Hand, including Giant Cell Tumours, Mucous Cysts, Haemangiomata and Ganglia.

Surgeon: 12 cases

17) Replantation of Severed Hands:

I was fortunate to be involved in two cases of hand replantation, one of which was a long term success.

18) Carpal Tunnel Release:

Surgeon: 6 cases
Assistant: 5 cases

19) Mallet Finger:

Primary Repair	Surgeon: 3 cases
Secondary Repair	Assistant: 2 cases

SOFT TISSUE TRAUMA:

1) Facial Lacerations:

Primary Suture — Surgeon: 63 cases

2) Partial Avulsions of the Pinna:

Cartilage buried under mastoid skin.	Surgeon: 2 cases
Replantation of Portion of pinna	Surgeon: 1 case

3) Degloving Injuries of the Lower Limb including Lacerations and Dogbites.

Primary Debridement and Suture and Secondary Skin Graft.

Surgeon: 17 cases

4) Revision of Scars:

Simple elliptical excision and revision by the use of flaps.

Surgeon: 60 cases
Assistant: 5 cases

5) Keloids:

Excision	Surgeon:	10 cases
Excision and skin graft	Surgeon:	4 cases
Triamcinolone injection	Surgeon:	13 cases

MAJOR FLAP RECONSTRUCTION:

Following Trauma:

This includes transposition flaps on the scalp, abdominal flaps and cross-leg flaps.

Surgeon:	10 cases
Assistant:	12 cases

Following Excision of Large Carcinomata:

Surgeon:	6 cases
Assistant:	4 cases

For Repair of Bedsores:

Surgeon:	2 cases
Assistant:	2 cases

FACIAL FRACTURES:

MANDIBLE:

1) Intermaxillary fixation:

Surgeon: 81 cases

2) Direct lower border wiring:

Surgeon: 46 cases

3) Gunning-Type splints:

Surgeon: 15 cases

4) Dental extraction:

Surgeon: 25 cases

5) Exploration of temperomandibular joint for fracture of the head of the mandible:

Surgeon: 1 case
Assistant: 1 case

MALAR FRACTURES:

These cases include those which were elevated only, those which were wired and those in which the floor of the orbit had to be explored as well.

Surgeon: 54 cases

FRONTO-NASAL FRACTURES:

Exploration and wiring Assistant: 2 cases

NASAL FRACTURES:

Closed manipulation under anaesthetic

Surgeon: 38 cases

LE FORT FRACTURES:

Craniomandibular fixation with Box frame

Surgeon: 2 cases
Assistant: 5 cases

Open reduction and direct wiring

Surgeon: 2 cases
Assistant: 3 cases

HEAD AND NECK CARCINOMA:

1) Commando operations: Assistant: 5 cases

2) Tracheostomy: Surgeon: 12 cases

3) Forehead flap: Surgeon: 10 cases

4) Hemimandibulectomy: Surgeon: 11 cases
Assistant: 5 cases

5) Maxillectomy: Assistant: 4 cases

6) Local excision of lesions in the floor of the mouth and tongue and bulk-reducing excisions of the palate:

Surgeon: 2 cases
Assistant: 6 cases

7) Radical neck dissection alone: Assistant: 1 case

8) Suprahyoid block dissection: Assistant: 3 cases

I have performed one major excision for head and neck cancer.

The patient had a carcinoma of the angle of the mouth, and following an initial course of radiotherapy, he came to surgery, where I excised the angle of the mouth and the whole of the right cheek, and performed a bilateral suprahyoid en bloc excision.

The full-thickness defect was reconstructed with a forehead flap for lining and a Bakamjian flap for cover. Unfortunately, the Bakamjian flap was lost and the patient required a number of procedures to obtain skin cover.

9) Converse Scalping Flap:

I was fortunate to be able to assist with two patients who had had their noses amputated for carcinoma, and who required this operation for nasal reconstruction.

10) Total amputation of the nose:

Surgeon: 1 case

This unfortunate man had recurrent carcinoma involving his whole nose and the amputation was performed to relieve him of pain which it succeeded in doing.

11) Reconstruction of buccal sulcus:

Assistant: 2 cases

These two patients had had Commando operations and had buccal inlay grafts in order to be able to be fitted with dentures.

SKIN LESIONS:

This includes benign and malignant skin lesions, the latter being in the majority.

1) Simple Elliptical Excision and Closure:

Surgeon: 202 cases

2) Excision Requiring Flap Reconstruction:

Surgeon: 56 cases

3) Excision Requiring Cover with Split Skin Graft:

Surgeon: 24 cases

4) Excision Requiring Cover with Full-Thickness Skin Graft:

Surgeon: 14 cases

5) Wedge Excision of Lip:

Surgeon: 9 cases

6) Wedge Excision of Ear:

Surgeon: 8 cases

7) Wedge Excision of Upper Eyelid:

Surgeon: 1 case

8) Lip Slide:

Surgeon: 4 cases

9) Composite Graft Reconstruction of Ala Nasi:

Surgeon: 1 case

10) Reconstructive Rhinoplasty using Forehead Flaps:

Surgeon: 5 cases
Assistant: 2 cases

11) Hidradenitis Suppurativa:

Excision and Skin Graft. Surgeon: 3 cases
Assistant: 2 cases

12) Inguinal Block Dissection for Secondary Malignant Melanoma:

Assistant: 3 cases

RECONSTRUCTION AROUND THE EYE:

1) Ectropion of lower lid and Wolfe Graft:

Surgeon: 3 cases

2) Fascial sling to lower eyelid:

Assistant: 1 case

3) Island Flap Reconstruction of Eyebrow:

Assistant: 1 case

LEG ULCERS:

Deslough and Repeated skin grafts:

Surgeon: 25 cases

AESTHETIC SURGERY:

1) Corrective Rhinoplasty:

Surgeon: 3 cases
Assistant: 10 cases

2) Submucous Resection of Septum:

Surgeon: 1 case
Assistant 9 cases

3) Rhytidectomy:

Surgeon:	1 case
Operating Assistant:	1 case
Assistant:	3 cases

One of the cases I assisted at also had a longstanding facial palsy, and I was fortunate to be able to observe a fascial sling operation combined with a rhytidectomy.

4) Facial Dermabrasion:

Surgeon:	2 cases

5) Abdominal Lipectomy:

Surgeon:	3 cases
Assistant:	5 cases

6) Blepharoplasty:

Surgeon:	5 cases
Operating Assistant:	1 case
Assistant:	4 cases

7) Brachial Lipectomy:

Assistant:	1 case

8) Buttock Lipectomy:

Operating Assistant:	1 case
Assistant:	2 cases

9) Augmentation Mammoplasty:

Surgeon:	6 cases
Operating Assistant:	3 cases
Assistant:	6 cases

10) Removal of Prostheses after Augmentation Mammoplasty:

Surgeon:	3 cases

In one of these cases, my first in fact, the patient presented in outpatients one week after the operation with evidence of superficial infection in the right sided wound. The prosthesis was presenting in the wound.

As the infection seemed to be superficial only, I admitted her, took her back to theatre, removed the prosthesis, washed out the cavity with an antibiotic solution, replaced the prosthesis, and irrigated the cavity for five days with a solution of Keflin.

We were extremely fortunate, as this manouevre worked, and the wound healed without any further trouble.

At long term follow-up, it was interesting to note that the involved side was firmer and rounder than the left breast.

11) Subcutaneous Mastectomy:

Assistant: 2 cases

12) Reduction Mammoplasty:

Surgeon: 19 cases
Operating Assistant: 11 cases
Assistant: 16 cases

13) Gynaecomastia:

Surgeon: 5 cases
Assistant: 3 cases

SEX RE - ORIENTATION:

1) Male to Female:

Neovaginoplasty

Surgeon: 1 case
Assistant: 5 cases

2) Female to Male:

This includes procedures such as insertion of testicular prostheses, urethroplasty, and secondary revision of scars.

Surgeon: 6 cases
Assistant: 8 cases

MISCELLANEOUS:

1) Forequarter Amputation:

Assistant: 1 case

This patient developed a Marjolin's ulcer in an old burn contracture, necessitating amputation and wide excision of the chest wall, to which the arm was adherent.

2) Gas Gangrene:

Skin graft following initial debridement by general surgeons.

Surgeon: 3 cases

3) Release of Temperomandibular Joint Ankylosis:

Assistant: 4 cases

CASE REPORTS.

CLEFT LIP.

The patient was a five month old boy, who presented with an incomplete cleft of the lip on the right side.

There was no family history of clett lip or palate.

The pregnancy had been uneventful and the child was born at full term.

EXAMINATION:

The child was a healthy boy weighing 6,8 kg.

All systems were quite normal and there was no evidence of any other congenital abnormality.

LOCAL EXAMINATION:

There was a (1), 2, 3, cleft of the lip present.

The palate was completely normal.

OPERATION :

REPAIR OF CLEFT LIP.

Surgeon: Dr. L. Berkowitz

PROCEDURE:

A Davies repair of the lip was performed.

The height of the normal side of the lip was 1,05 cm. and from this the lengths of the limbs of the Z-plasty were calculated to be 0,6cm.

After the appropriate triangles had been cut, the mucosa in the buccal sulci was divided in order to allow the elements to advance. This was aided by making a backcut at the end of the mucosal incision.

A small triangle of the nasal floor was also removed in order to equalise the two nostril sills.

When trimming the vermilion at the end of the operation, a point was made of leaving enough to recreate the normal pout that is present in the lips of normal children.

The wounds were sutured with 4/0 Dexon and 7/0 Vicryl to the skin.

POSTOPERATIVE COURSE:

The child did well after the operation. He was apyrexial and was eating well on the day after the operation.

For the week following the operation, arm restraints were used to prevent the child from playing with the lip and interfering with the repair.

He was discharged one week postoperatively. The lip had a very pleasing appearance, with a good tubercle in the midline and equal heights on both sides of the lip.

He was seen again in outpatients two weeks later when all was well, and he was discharged, to be seen again in one year's time.

Preoperative.

One Month Postoperative.

DISCUSSION;

The principal objective in cleft lip surgery is to form the lip and other involved structures into a state as near normal as possible, both functionally and anatomically.

The essential features are;

1.) A symmetrical, well- balanced lip with a normal looking cupid's bow.

2.) A full vermilion with preservation of the mucocutaneous line.

3.) A natural looking philtral ridge and dimple.

4.) A symmetrical nose with restoration of the nostril floor and sill and elongation of the columella.

5.) Negligible scarring.

The basic problem in unilateral clefts is tissue displacement combined with tissue deficiency. Fortunately, certain landmarks are always identifiable, such as the midpoint of the lip and the peak of the cupid's bow on the uncleft side.

The cleft margins are drawn upwards into the gap toward the nostril floor, shortening both sides. Any design for repair must correct this shortening so that the lip on completion of the repair will be the same length as the uncleft side.

Mathews feels that the deticiency of tissue is such that a straight line repair produces a short lip and says that one must use a flap to increase the vertical height of the lip.

It is important to remember that in surgery for correction of congenital abnormalities such as cleft lip one cannot know the final result until the child is fully grown.

As in any other branch of surgery, one should avoid repeating the mistakes of the past. Nowhere is this more important than in surgery of the nose tip, where a satisfactory result in childhood may eventuate in a hideous deformity in the adolescent.

TECHNIQUES OF REPAIR:

The modern period of lip repair dates from 1949 when Le Mesurier described his operation based on Hagedorn's method (1884).

The Le Mesurier is an excellent repair method. A quadrilateral flap is taken from the cleft side and inserted into the normal medial side. Thus, Le Mesurier was the first to attempt construction of the cupid's bow of the vermilion.

However, the method has certain disadvantages that make it less acceptable for general use, than the triangular rotation flap.

The measurements, especially of the ingenious modifications, are very complicated.

Measurements made from the cleft side are arbitrary and are designed to construct a cupid's bow that is already present, albeit distorted. Overcorrection of the cupid's bow and an asymmetrical lip may result because there is a tendency for the vermilion from the uncleft medial side to be rotated too far.

Even a slight miscalculation in the size of the quadrilateral flap can make the lip too long or too short on the cleft side. There is no other method in which so much tissue is discarded.

A surgeon, experienced in the method, will have learned to adjust for various deficiencies, but a novice is unlikely to achieve as satisfactory results as with other simpler procedures.

Finally, what appears to be a good primary repair may later be disappointing since unequal growth on the two sides may cause the lip on the cleft side to be too long vertically. The scar is often obvious and does not always improve with time.

For these reasons some authors believe that this method of repair should be reserved for secondary lip repair. They feel that if the lip already has most of its growth, the results are often better than with other methods.

To correct the problem of the overcorrection of the cupid's bow, Steffensen (1949) and Brauer (1953) excised a triangular segment of lip tissue above the mucocutaneous line to effect a more natural vermilion and cupid's bow.

Tennison (1952) simplified Le Mesurier's method. He inserted a triangular flap from the cleft to the uncleft side, thus avoiding overcorrection. He used a wire stencil to mark out his incisions.

Davies writes that this repair gives a good average and at times superb result. His only criticism of the repair is that the volume of the bulky lateral element that should be rotated into the lower half of the lip is insufficient and that the triangles are rather small to work with.

Brauer, in 1959, concluded that Tennison's method is superior to the Le Mesurier operation for repair of the unilateral primary clefts for the following reasons:

1) It saves valuable tissue on the normal side of the cleft to form part of the cupid's bow for the normal side, whereas this tissue is sacrificed by the Le Mesurier operation.

2) It relieves vertical shortness of the lip on the cleft side in the body of the lip rather than merely in the lower third.

3) The scar falls laterally, where it is far less noticeable than is a central scar which distorts the cupid's bow and displaces it laterally.

In 1958 Millard introduced the rotation-advancement technique into plastic surgery. This is almost certainly the most commonly used repair today, and is regarded by many surgeons, including those who have been responsible for my training, as particularly useful in the repair of the incomplete cleft of the lip.

A triangular flap is shifted from one lip margin to the other, the tissue being shifted at and below the nostril floor so that a minimal amount of lip tissue is discarded. Advancing the flap beneath the columella gives adequate length to the lip, and the wound is closed along a line closely simulating the normal philtral ridge. At the same time the columella base is shifted upward and the flaring ala nasi is drawn medially, thus creating a longer columella and a natural appearing nostril floor and sill.

This repair, which has yielded excellent results,does not rely on a set of predetermined points; any adjustments required can be readily made. An additional advantage is that secondary repair can be readily accomplished by simple reduplication of the original incisions.

Authors disagree on the degree of technical simplicity of this operation. Stark in his book on Cleft Palate states that it is a relatively simple procedure, while Davies feels that while " the line diagrams are simple, the logic flawless and the concept brilliant, many surgeons struggle to execute it."

Millard regards the medial element as the strong element of the lip. Looking at the thick, fleshy lateral element, and the thin, attenuated, often almost atrophic medial element, Davies feels that many surgeons would disagree with this. He goes on to point out that the approximation of two convex curves appears to leave the majority of the bulk in the centre of the lip and not on the lower rim. In the more extreme clefts, this often leaves the child without a pouting appearance.

Davies feels that this repair seems to fall somewhere on the scale between a straight line repair and a Z-plasty, as it is really a straight line repair with a Z-plasty perched on top and suffers from the advantages and disadvantages of both. Contraction of the long straight line scar can and does occur.

Davies has written, concerning cleft lip repairs, that either the procedure is simple and the results variable, or the results show a more uniform constancy and the procedure is inordinately complicated.

The ideal repair should be easy, predictable, sacrifice the least amount of tissue and the operative result should remain unchanged through the years that follow.

In attempting to find such a repair Davies has described his Z-plasty operation. He feels that it is a logical extension of the Tennison repair which is also a form of Z-plasty. However, he feels that the design of the operation is easier when it is taken to its logical conclusion by calculating the size of the Z-plasty from the height of the normal side of the lip. The flaps are larger and easier to manipulate and the bulk of muscle transferred to the lower half of the lip is more significant.

The lower border pout is good and the length of the lip remains unchanged through the years. Owing to the Z-plasty closure, the lip will remain the same length postoperatively as it is on the table at the end of the operation.

Davies feels that the main bulk of the muscle fibres of the lateral element tend to turn upwards at the cleft margin and are brought down in his operation, with the lateral triangle to their correct direction in the oral sphincter.

It will be understandable that, as I have received my training in cleft lip surgery under the guidance of Dr. Davies, his method of lip repair is the one with which I am most familiar. This does not mean that this operation is the only one to which I have been exposed, as Dr. Davies and other teachers of mine are keen exponents of Millard's operation in suitable cases.

As a young and therefore relatively inexperienced plastic surgeon, however, I am able to bear out the claims regarding the simplicity of the Z-plasty operation and the relative ease with which it may be learned and executed by a novice. By making use of the fixed points that are available and simply calculating the size of the triangles from the height of the normal side of the lip, one is able, with a fair degree of certainty,to achieve a predictable result.

The commonest criticism levelled against this operation, is the fact that the horizontal limb of the Z-plasty crosses the area of the philtral ridge on the cleft side. In practice this has not been a problem and in fact the most troublesome and noticeable part of the scar is the point and ascending limb of the Z-plasty. It sometimes has a tendency to form a miniature trapdoor or bridle scar, which can be avoided by freeing the skin from the subcutaneous tissue at this point when suturing the lip.

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CLEFT PALATE:

The patient, a three year old girl, presented for repair of her 9-11 cleft palate. There was no family history of cleft lip or palate, and no other history of note.

EXAMINATION:

All systems were normal and there was no evidence of any other congenital abnormalities.

LOCAL EXAMINATION:

A 9-11 cleft of the secondary palate was present. The primary palate was quite normal.

There was no upper respiratory infection and the ears were healthy.

The child had typical cleft palate speech with increased nasal resonance and escape.

Her teeth were in fairly good condition and there was no caries present.

OPERATION:

TWO FLAP WARDILL REPAIR OF CLEFT PALATE.

Surgeon: Dr. L. Berkowitz.

PROCEDURE:

The operative field was injected with POR-8.

Two Wardill mucoperiosteal flaps were raised after the edges of the cleft had been split. The greater palatine vessels were freed from the bony canal.

The nasal mucosa was freed from its attachment to the hard palate, but not divided.

A good pushback was obtained.

Closure was with 4/0 chromic catgut to the nasal layer and 4/0 Vicryl on the oral side.

The mucoperiosteal flaps were anchored to the hard palate by means of two 4/0 chromic catgut sutures.

The hamuli were not fractured nor was an island flap used.

Blood loss, estimated colorimetrically, was 25 ml. and no blood was given.

POSTOPERATIVE CARE:

The child was kept nil per mouth for the first twenty-four hours and had intravenous fluids during this period.

The child was treated in a head box with humidified air.

Keflin 250 mg. six hourly intravenously was given.

The patient did well and the postoperative course was uneventful.

The palate healed primarily and the child was discharged one week after the operation to be followed up at regular intervals, for the rest of her growing period.

Preoperative.

Immediately Postoperative.

DISCUSSION:

Cleft of the secondary palate is a considerable handicap because velopharyngeal incompetence results in defective speech and glutition and occasionally hearing.

One's foremost goal is therefore to construct a competent, functioning airtight valve at the junction of soft palate and posterior pharyngeal wall.

Ideally, the care of these children should be the responsibility of a cleft palate unit made up of representatives of all the services which have something to offer these children.

The Cleft Palate Unit at the Red Cross Hospital is made up of the following people:

1. Social Worker

The Social Worker is responsible for investigating the hereditary history of the child and assessing the social and environmental factors that might have influenced the pregnancy.

2. Orthodontist

He is responsible for correcting any defects of the alveolar arch that might occur and also for producing a normal occlusion once the permanent teeth have errupted.

3. Ear, Nose and Throat Surgeon

These children have a very high incidence of otitis media and hearing loss and the E.N.T. surgeon is responsible for keeping an eye on the child's hearing and also treats the problem of enlarged tonsils or adenoidal pads if this should arise.

4. Radiologist

Every child with a cleft palate has a cephalogram as a routine procedure.

Many of the children are also screened on an image intensifier to assess the degree of movement of the palate during phonation.

5. Photographer

A complete set of photographs of the child is a very important part of the records of the clinic.

6. Paediatrician

These children often have feeding problems and are therefore undernourished and more prone to complications than normal children. The paediatrician helps in looking after the overall care of the child.

7. Plastic Surgeon

The Plastic Surgeon is responsible for performing the surgery and for coordinating the efforts of the group as a whole.

The surgical techniques used commonly in our unit are the following.

Either a two flap Wardill repair or a Dorrance pushback is the method used to close a simple cleft of the secondary palate. The Dorrance is more often used for treating the incomplete clefts i.e. the 10,11 clefts, whereas the Wardill is used to close clefts involving the hard palate as well.

It is no longer a routine practice to fracture the hamuli as the value of this manouevre in producing increased relaxation in the soft palate is questioned by some surgeons.

Millard's island flap which was very popular some years ago for closing the defect in the nasal mucosa after the pushback procedure, is no longer used in our department. This flap was used to prevent secondary shortening of the repaired palate by scarring of the raw area on the nasal side of the soft palate. Observing the children who had this procedure done on the image intensifier some years later, one is impressed by the constancy of one's observations in many of these children. The flap is seen as a large blob of tissue on the nasal side of a palate which is not infrequently short. It is one's distinct impression that this flap has not fulfilled its original aim, at least not as practised here.

Another procedure that is no longer carried out routinely in every case is division of the nasal mucosa. Instead, the mucosa, both oral and nasal layers, of the soft palate is dissected off the posterior border of the hard palate. It is felt that this manouevre will allow a significant amount of pushback to be achieved and that it is therefore not necessary to divide the nasal mucosa automatically and leave a raw area which will cause shortening by scar formation.

The question of timing for this operation is another one that has been a controversial subject for some time.

My teachers believe that a child starts to speak when it makes its first noises and therefore, it should have a normal speech mechanism as soon as possible after birth.

The routine here is to close the cleft at the age of three months, if the child is well and fit for surgery.

The results that are obtained as far as speech is concerned are not always directly related to the results of surgery. The child may have a long mobile palate and have poor speech and he may have a short, stubby palate and have normal speech.

If the operation has failed to achieve functional velopharyngeal competence, it sometimes becomes necessary to perform a pharyngeal flap.

This flap is intended to assist the velum in achieving velopharyngeal closure at the same time blocking off part of the airway to the nose, thereby decreasing nasal escape.

It is occasionally the policy in our unit to perform a primary pharyngeal flap on children who have presented for surgical correction relatively late, when their speech patterns are already well established, as it is felt that a pushback operation alone will not achieve adequate velopharyngeal closure.

Slaughter and Brodie as far back as 1949 studied maxillary development and found that it was rapid until the fifth year when it slowed down. They believe that early operation covered the palate with scar tissue, resulting in loss of vascularity and thus interfering with growth and development. They therefore felt that surgery of the palate should be deferred until five years of age.

This belief is not accepted today, but the question of how much the growth of the maxillae is interfered with, if at all, by early surgery is still not answered. This has particular importance with reference to the early complete repair of clefts of the primary and secondary palate which are today being performed as early as six days of life in our unit. It will be many years before these children will be able to be assessed finally and a decision made as to whether they benefited or not from this early radical surgery.

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COLUMELLA LENGTHENING.

This three-and-a-half year old child had had a repair of her bilateral cleft lip and palate performed at the age of six months. A Schultz Hoffman repair of the lip and a two flap Wardill repair of the palate had been done.

She presented now for secondary correction of the short columella.

EXAMINATION:

The child was well and examination of all systems confirmed that she was fit for surgery.

LOCAL EXAMINATION:

The columella was extremely short with the tip virtually adherent to the lip.

OPERATION:

Surgeon: Dr. L. Berkowitz.

PROCEDURE:

With the columella as the base, the prongs of the forked flap were marked out so as to reduce the prolabium-to-philtrum dimensions and at the same time to include the scars of the original lip repair.

The field was injected with POR-8 and five minutes were allowed for this to act.

The forked flaps were then raised, the incisions being carried deeply to include as much bulk as possible in the flap.

The incision was then carried up along the membranous septum to free the short columella up to the tip of the nose.

Once the flaps were completely free, they were sutured together with 5/0 Dexon. The tube so formed was then sutured to the membranous septum, after which the secondary defect was closed using 6/0 Dexon.

POSTOPERATIVE COURSE:

This was uneventful. The wounds healed primarily and she was discharged on the third postoperative day.

Preoperative.

Immediately Postoperative.

Ten days Postoperative.

DISCUSSION:

The short columella is the commonest secondary nasal deformity following repair of a bilateral cleft lip and palate.

The short columella and nasal septum and snub nasal apex are due to a deficiency of mesoderm of the intermaxillary process. It is believed that there is a failure of downward and forward growth of the maxillae deprived of the pull of the expanding septum.

This pull is then transmitted through the lower lateral cartilage arch which, quite unable to take the strain, flattens and then pulls down off the back of the septum.

There have been a number of operations described to correct this deformity of which the best-known are probably those of Skoog and Millard.

Skoog's operation combines the rotation advancement principle in the upper lip with the triangle flap in the lower lip for unilateral clefts. For bilateral clefts he adds a transverse transposed flap of lateral prolabium based above to be inserted across the base of the columella.

Millard feels that there are two disadvantages to this method:

1) There is limitation in the amount of possible columella lengthening; and

2) the double lengthening of the prolabium may end with an upper lip that is too long in its vertical dimension.

Millard's operation has the advantage of lengthening the columella and reshaping the prolabium at the same time by narrowing it and producing scars which resemble the philtral pillars.

The degree of upwards advancement of the blunt nasal tip, which has been freed by the intercartilaginous incisions, will determine its ultimate sharpness and narrowness.

If the nostril floors are too wide, they may be narrowed by excising wedges. This was not done in my case.

In my reading on this subject, I have come across an interesting example of the development and change that can occur in a surgeon's thinking over a period of years as his experience in a particular field increases.

Millard first described his operation for columella lengthening by use of the forked flap technique in 1958.

In 1967 he wrote that the ideal approach to the soft tissue in bilateral clefts of the lip would close both lip clefts artistically in a single primary operation, and at the same time lengthen the columella and free the nasal tip so that subsequent development and growth would progress unimpeded. It seemed logical to him that this goal might be achieved if a primary forked flap were possible. Prior to this, hesitation towards using this technique as a primary procedure had been based on the fear of interrupting prolabial blood supply.

In complete bilateral clefts, the main blood supply to the prolabium-philtrum comes through the columella and the septum in the form of the posterior septal artery and, to a lesser extent, the lateral nasal and terminal branches of the anterior ethmoid vessels.

According to Slaughter, Henry and Berger, cleft specimen dissections usually indicate one well differentiated vessel on either side of the premaxilla in the region where the incisive foramen should have been. Each of these vessels passes anteriorly and inferiorly into the philtrum and continues medially in an arc to anastomose across the midline in the inferior portion of the philtrum. No mention is made of a direct blood supply from the premaxilla running forward into the mid-posterior prolabium. Yet, in surgery, while freeing the prolabium from the premaxilla, invariably generous bleeding is noted.

Millard wrote further that he had found that this to-and-fro vascularity between the prolabium and the premaxilla was adequate to sustain the prolabium or any attached portion of it even following its complete severance from the nasal tip and septum.

In the light of these findings, he advocated combining one-stage closure of both sides of a bilateral cleft lip with primary forked flaps.

However, in his chapter on Cleft Lip in Grabb and Smith's textbook of Plastic Surgery (1973 Edition,) he writes that the use of primary forked flaps has been discontinued in complete clefts as there is some danger to the prolabial blood supply, and there seems to be gradual lengthening in vertical dimension of the upper lip.

Millard's views have obviously come full circle and he now, once again advises the conservative approach. The biggest problem in assessing one's results and in forming definite opinions when dealing with congenital abnormalities is the fact that one has to wait until the children have grown up before one knows what the long-term effect of any particular operation is going to be on growth. This is obviously what happened to Millard.

The philosophy in my department is also basically conservative and, as was done in the case I have described, secondary correction of columella shortening is left until the child is three to five, and correction of the nasal skeleton i.e. a full corrective rhinoplasty, if it is necessary, is left until the child has completed growing.

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NASAL RECONSTRUCTION.

This nineteen year old coloured man presented to our department with a defect of his right ala nasi sustained as a result of a human bite, in a fight seven months previously.

EXAMINATION:

The patient was, in all respects, a fit and healthy young man.

LOCAL EXAMINATION:

Careful examination of the nose revealed scarring along the right side of the nose where the edge of the nostril should have been. It was apparent that the whole rim of the ala nasi from the tip of the nose to the ala base was missing.

This was obviously an unsightly cosmetic defect and the patient requested correction. The question of secondary scarring either on the face or on the ear was discussed with the patient but this did not deter him from requesting surgery.

OPERATION:

RECONSTRUCTION OF THE RIGHT ALA NASI.

Surgeon: Dr. L. Berkowitz.

PROCEDURE:

The scar tissue was excised and the lower edge of the defect turned down to serve as a lining.

A right naso-labial flap was raised and kept as thin and narrow as possible. The flap was trimmed to fit the defect and sutured in place using 4/0 chromic catgut and 6/0 interrupted black silk sutures.

The right nostril was packed with Calgitex and the wound was dressed with saline-soaked gauze swabs.

POSTOPERATIVE COURSE:

On the first postoperative day the plug was removed and the dressing was changed.

The flap was completely viable and remained so.

On the fifth postoperative day the patient was discharged home and, as he was from the country, it was arranged that he return after six months for reassessment and possible revision of the base of the flap.

Note Missing Edge of Right Ala.

Excision & Flap Planned.

Excision Complete & Flap Raised.

Flap Inset.

One Week Postoperative.

DISCUSSION:

Human bites are not infrequent accompaniments to the overall picture we see in cases of interpersonal violence.

On the face, the commonest sites seem to be the lips and then the ear.

On the lips it is interesting to note that these defects often seem to contract very significantly leaving only a small scar which not infrequently requires no further treatment.

When the nose has been the site of the attack, the problem is compounded by the fact that there is no excess local tissue waiting to be taken up by the contracting wound as is the case with the lip, and tissue has to be imported to make up the deficit.

In my patient, as the defect was composite consisting of skin, cartilage, and mucosa, a composite flap was necessary to supply the required bulk, covering and lining.

There were three methods to be considered in treating this patient.

A method which is sometimes employed in reconstructing defects of the ala nasi is that which employs the use of local flaps of skin and mucosa. This method was not suitable in this case as the whole ala rim was lost and shifting the scarred edge down to serve as the ala rim would only have resulted in a doubly scarred nose with minimal overall cosmetic improvement.

A composite graft from the ear is very suitable for reconstructing defects of the ala rim but in this case would have needed to be very long and bulky. This would have decreased considerably the chances for survival of the graft.

Also of some importance would have been the very large secondary defect created in the pinna.

The third choice available was that of a local flap and the obvious choice was the naso-labial flap, which would give the necessary tissue from an available source, supplying a good colour match and leaving a barely discernible secondary scar, despite the youth of our patient. This flap was also considered suitable because only a small amount of lining was required and could be obtained from the edge of the defect rather then having to be supplied by the flap.

The main disadvantage of using the naso-labial flap for this sort of defect is its bulk which gives a thick bulky ala rim. This can, of course, be revised and trimmed at a later stage. Another problem is that of the "dogsear" which is present at the base of the flap. This can be dealt with to a certain extent by undermining at the base, but this is obviously a dangerous practice and must be carried out with care.

This case was an interesting exercise for the aspirant plastic surgeon in assessment and planning of the reconstruction and promises to be a reasonably acceptable late cosmetic result.

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SCALP FLAPS.

This seven year old Bantu boy was admitted to the Accident Unit at Groote Schuur Hospital, after having been knocked down by a car, which had apparently passed over his head.

EXAMINATION:

Central Nervous System:

The child was unconscious but reacted to painful stimuli. His reflexes were all positive and equal, as were his pupils.

Cardiovascular System:

Pulse: 68/min.
Blood Pressure: 130/90 mmHg.
Haemoglobin: 9,5 G%.

Respiratory System:

Nothing abnormal detected.

Limbs:

There was pretibial laceration on the right leg. Otherwise the limbs were normal.

Abdomen and Pelvis:

Nothing abnormal was detected. Urine was clear.

Head:

There were diffuse abrasions on the right side of the head and face, with full-thickness skin loss in the right parietal region.

The right pinna was partially avulsed from the head. It was apparent that he had been dragged along the road by the car.

MANAGEMENT:

1. The airway was adequate and he did not require assistance.

2. An intravenous infusion of Plasmalyte B was started and blood ordered.

3. He was seen by the Neurosurgical Registrar on call who found his neurological status to be as described above.

X-Rays of the skull showed a fracture of the occiput running into the foramen and a fracture through the right petrous temporal bone.

He was placed on a triple antibiotic regime consisting of:

Penicillin - 1 million units 4 hourly intravenously.
Sulphadiazine - 250 mg. 4 hourly intravenously.
Chloramphenicol - 250 mg. 4 hourly intravenously.

4. He was also seen by the Plastic Surgery Registrar on call, who took him to theatre and under general anaesthetic, sutured the torn ear and the laceration on the leg.

The wounds on the face and head were dressed with tulle-gras and saline-soaked gauze swabs.

The child was then admitted to the neurosurgical intensive care unit for observation of his neurological status.

Over the next five days his neurological status returned to normal. His ear healed without any tissue loss.

By this time it was apparent that a reconstructive procedure would be necessary to close the full-thickness scalp defect.

Eleven days after admission, the child was taken to theatre for reconstructive surgery to the scalp.

OPERATION:

FLAP REPAIR OF FULL-THICKNESS LOSS OF SCALP IN RIGHT PARIETAL REGION.

Surgeon: Dr. L. Berkowitz.

Findings:

There was a defect in the scalp measuring approximately 3 x 2 cms. in the right parietal region.

PROCEDURE:

The defect was triangulated by excising the surrounding poor quality skin.

A rotation flap was then raised based anteriorly, with the backcut being made in the region of the mobile skin in the mastoid region. After careful haemostasis, the flap was sutured using interrupted 3/0 and 4/0 black silk sutures.

A corrugated drain was used and brought out of the lower edge of the flap and sutured in place.

Saline soaked gauze swabs were used to dress the wound, following which a crepe bandage was applied.

POSTOPERATIVE COURSE.

The child remained well postoperatively. On the second postoperative day, the drain was removed. By the tenth postoperative day, the wound was completely healed. The sutures were removed two days later, when the patient was discharged.

At outpatient follow-up, one month later, the flap was found to have healed well and the child was discharged to the long-term care of our neurosurgical colleagues.

Preoperative:
Note Bare Bone.

Excision & Flap Planned.

Excision Complete
and Flap Raised.

Note Bare Bone.

Immediately Postoperative.

One Month Postoperative.

DISCUSSION:

With the ever-increasing epidemic of road accidents providing large numbers of admissions to our Accident Unit, the problem of skin loss is one with which we often have to deal, particularly in the form of degloving injuries.

On the scalp, the problem is compounded by the fact that full-thickness defects cannot be treated by means of a simple skin graft because of the presence of exposed bone. The solution therefore, lies in full-thickness skin cover.

In those, fortunately unusual, cases where large areas of scalp are lost, distant flaps have to be employed, but in small areas of loss, as with the case of this child, the treatment of choice is a local flap.

There are two types of flap which are suitable in this sort of case.

A transposition flap would solve the problem perfectly adequately, but has the disadvantage of leaving a secondary defect which requires skin grafting, leaving the patient with a non-hairbearing defect in the scalp. If a transposition flap is used, it is terribly important to remember in planning it, that the skull consists of a sphere with a number of differing radii, and if a flap is transposed from a smaller to a larger curvature, it has to be made correspondingly bigger in order to cover the defect.

In this case, the rotation flap was the method of choice because it provided the full-thickness cover required, without leaving any secondary hairless defect.

By designing the flap in the manner illustrated in the photograph, use was made of the mobility of the mastoid skin to supply the required rotation and allow the secondary defect to be closed as a "V" to "Y" closure, without tension. Had the flap been planned on the left side of the defect, it would not have been as mobile and it would have been correspondingly more difficult to close the secondary defect had the backcut been made in thick scalp skin.

A point worth making regarding the use of flaps of substantial size here or anywhere else in the body, is a necessity for draining the flaps. Despite careful haemostasis, there is always a collection of serous fluid or blood after creating a large raw surface, and many a flap has been lost due to the pressure caused by such an undrained collection.

The old adage of never regretting using a drain, but often regretting not using one, certainly applies here, and I feel that it is imperative to do so.

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CROSS LEG FLAP:

This eleven year old boy was admitted after being knocked down by a car.

EXAMINATION:

General:

He was fully conscious.

Cardiovascular System:

Pulse: 120/minute

Blood Pressure: 100/60 mmHg.

Respiratory System and Abdomen:

Normal. No evidence of any injuries.

LOCAL EXAMINATION:

His only injury was to the medial side of the left ankle.

The car had apparently passed over the leg.

There was a degloving injury of the medial side of the left leg. The medial malleolus was destroyed and the ankle joint was open. Surrounding this there was an area of partial thickness skin loss.

EMERGENCY MANAGEMENT:

An intravenous infusion was started and blood was crossmatched.

The child was kept nil by mouth and given tetanus toxoid 0,5 ml. intramuscularly. Ampicillin 500 mg. six hourly intravenously was ordered. Morphine was ordered for pain.

That evening the child was taken to theatre by the trauma surgeon and the wound was debrided.

Findings:

The ankle joint was open on the medial side, and the medial malleoulus had been lost.

The subcutaneous surface of the distal tibia had been denuded of periosteum over a distance of 2,5 cm. and distal to this cortical bone had been lost.

The tendons and vessels in the region were intact.

PROCEDURE:

The wound was scrubbed with Betadine surgical scrub and the joint was then flushed out with saline.

The wound was then debrided. The capsule of the ankle joint was closed, incorporating some articularcartilage that had been left behand when the medial malleolus was avulsed.

The wound was then dressed with saline dressings.

In the ward, the foot of the bed was elevated.

The following morning, the child was referred to our department for definitive management of the large skin defect.

It was decided that this child was a good candidate for a cross leg flap as he obviously required early flap closure of the wound, and this was arranged for the same day.

OPERATION:

CROSS LEG FLAP.

Surgeon: Dr. L. Berkowitz.
Assistant Surgeon: Dr. R. Strover. (Consultant).

PROCEDURE:

The previous debridement had been thorough, but in order not to take any chances on the viability of the edge of the wound, a further 3 mm. was excised all the way round the edge.

A flap was then planned from the medial side of the right leg, using lint to ensure that the flap was large enough and fitted the defect.

The flap was then raised. The secondary defect was skin grafted from the right thigh. The graft was carried onto the flap almost up to the level of the inset, and dressed with a tie-over dressing consisting of saline-soaked gauze swabs.

The flap was then inset with 4/0 black silk sutures while the legs were held in position by my assistant.

The donor site for the skin graft was dressed with an Op-Site and the flap inset was covered with only one layer of tulle-gras.

The legs were then immobilised by means of Plaster of Paris. First, the pressure points were padded with adhesive orthopaedic felt. The legs were then wrapped in Velband at the level of the knees and around the feet. The feet were individually wrapped in plaster and the two were then joined together. The knees were then joined by means of plaster.

At the end of the procedure, the flap appeared to have a good blood supply and was lying comfortably with some slack between the legs.

POSTOPERATIVE COURSE:

The child was placed on Keflin 1g. six hourly intravenously, and Morphine was prescribed for pain.

The legs were suspended from an overhead baulk and beam by means of sheepskin slings.

The patient's course was uneventful. He was comfortable in the slings and never complained. The plaster immobilisation was checked every day to detect any sign of rubbing or pressure, but these were never found.

On the seventh postoperative day, the tie-over dressing was removed and the graft found to have taken completely. The grafted area was then dressed with Betadine cream.

Two weeks after the first operation, the child was taken back to theatre and the flap was divided.

The skin graft was found to have taken completely, and the flap bled freely from the cut edge.

The free edge of the flap was not inset after the division, for fear of interfering with its blood supply. The wound was simply dressed and the plan was for the patient to be taken back to theatre after four to five days for a definitive inset.

The edge of the donor site was sutured.

As this case is currently being treated, there is obviously no follow-up available at this time.

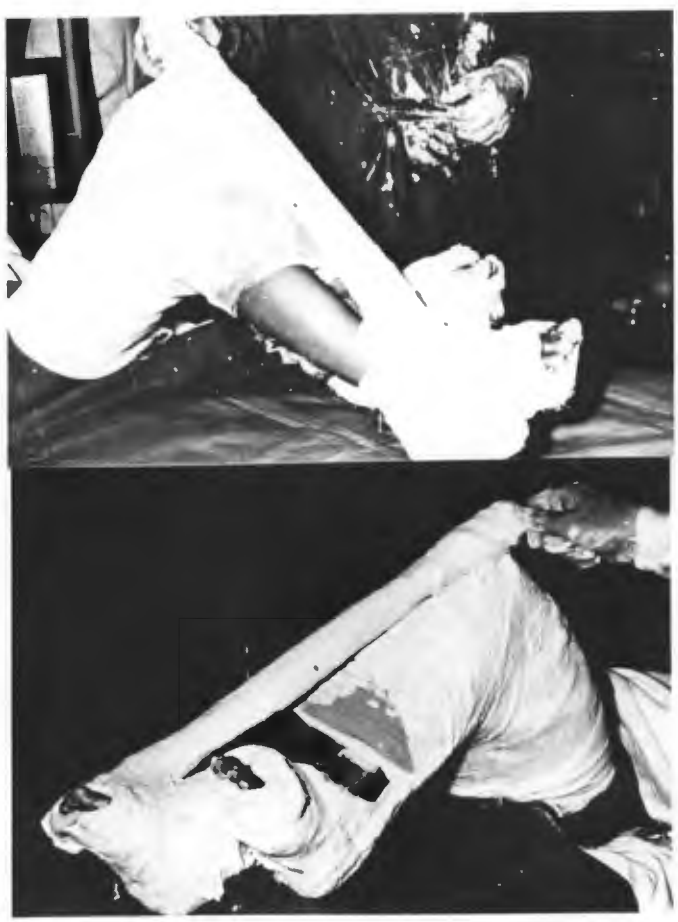
Preoperative.

Flap Planned with Lint.

Flap Raised.

Secondary Defect Grafted.

Flap Inset.



Immobilisation.

Flap Divided.
Note Freely Bleeding Edge.

DISCUSSION:

Early or immediate flap repair of traumatic defects is an uncommon procedure.

There are no absolute indications for immediate flap cover. If one is in a situation where it is not possible to do a flap immediately, one could always dress the wound until the correct circumstances prevailed, or even to do a split skin graft as a temporary dressing.

There are, however, relatively urgent indications for early flap closure of traumatic wounds.

These include wounds in which there are exposed bone, particularly if the orthopaedic surgeon wants to internally fix the fractures as a primary procedure, exposed nerves tendons or joints, as was the case with this patient.

The cross leg flap is a very useful means for providing cover for a defect of the leg or foot, but it is a troublesome technique which requires a lot of care in the planning and execution, and a very careful postoperative supervision.

PLANNING:

As in all plastic procedures, sound preoperative planning is essential to ensure success with a cross leg flap. This includes steps which, if not carried out, can lead to a situation which is both trying and embarassing for the surgeon.

When planning to do a cross leg flap, particularly on an adult, it is essential to practise placing the legs in the appropriate positions in the ward. If this is not done, it is not inconceivable that a situation could be encountered where the flap had been raised only for the surgeon to discover that the patient had a stiff hip or knee and that the procedure was therefore not possible. Although this might sound very unlikely, it is nevertheless a possibility that must be considered and can easily be avoided by proper planning.

At operation, it goes without saying that, once the surgeon has decided on the best donor site for the flap, the flap should be planned using lint and accurately measuring the size of the defect and the flap to ensure that the flap will achieve its intended goal. There must be few things more trying than to raise a flap and then to discover that it is too small.

TECHNIQUE:

When raising the flap, it is essential to obtain release of the deep fascia over the 2-3 cm. nearest the base, in order to ensure that the perforating vessels are not damaged as they enter the flap at this level.

Connelly, writing in Grabb and Smith's Textbook on Plastic Surgery, says that the secret of success is to plan the length of the flap to be as close to one half of the width of the base as possible. Particularly in children, the blood supply seems to be better than this, and our flap was more of the ratio of 1,5-1,0 length to width.

The flap whould be planned at least 2,0 cm. longer than seems to be required, in order to leave this amount of slack between the legs. This will make it less likely that there will be a disruption if there is any movement of the legs relative to one another.

A useful practical point is to remember to skin graft the secondary defect prior to insetting the flap as this can be very difficult after the two legs are joined together. Further, it is advisable to carry the skin graft as far as possible onto the base of the flap on the undersurface as this area is always troublesome during the interim phase, and remains much cleaner if it is covered with a skin graft.

It is occasionally necessary to use a drain, but in our case there was no need as the flap was able to drain quite well on its own.

POSTOPERATIVE IMMOBILISATION:

This is in fact the most important part of the procedure and holds the key to success or failure. A well planned and executed flap will be lost if the legs are not well immobilised.

First, the pressure areas must be protected. The lateral popliteal nerve, the Achilles tendon and the heels are covered with adhesive orthopaedic felt which is also placed between the knees. The feet are then covered individually with cottonwool or Velband and a plaster boot is then made for each foot. The feet are then joined with plaster making sure that there is no tension on the flap. The thighs or knee area are then covered with wool and fixed together with plaster. As soon as the plaster has been applied and dried, it must be checked for any pressure points and adjusted if necessary.

As soon as the patient is in his bed, the legs should be suspended on slings as I described earlier on. This relieves pressure on the skin and allows the patient to be more mobile in bed.

It is absolutely essential to check the immobilisation at least once a day for pressure areas or any other sign of discomfort and one must always take seriously any complaints of pain that the patient might have. These should be investigated immediately if complications in the form of pressure sores are to be avoided.

COMPLICATIONS:

1. Pressure Sores:

These may occur on the legs due to pressure from the plaster immobilisation.

One must particularly be aware of the areas where the plaster boots press on the Achilles tendon when the legs are hanging up in the slings.

Pressure sores may also occur in the usual sites due to forced bedrest such as the sacrum, and preventative measures must be taken to avoid these. The patient should be nursed on a sheepskin and be encouraged to turn regularly.

2. Deep vein thrombosis:

This is a very real problem in adults and it is worth considering putting these people on prophylactic subcutaneous heparin if the flap is carried out as an elective procedure.

If not, it is essential to keep the possibility in mind at all times and to look for the early signs of thrombosis at least twice a day.

3. Chest infections:

Because they are forced to lie relatively quietly, adults particularly are prone to develop chest infections and daily physiotherapy is worthwhile prophylaxis.

4. Psychological trauma:

The posture that these patients have to adopt for a few weeks is a very unnatural one and very trying. They are uncomfortable. They become claustrophobic. Even so natural an act as defaecation becomes a logistical exercise, and it is not infrequent to find responses occuring which might, under normal circumstances, be considered very unlikely for a particular patient.

For this reason, and also primarily for the health of the flap, it is preferable, in adults, to have an adjustable form of immobilisation.

The cross leg flap is a very useful technique for obtaining full thickness cover in the lower limb. However, as I have attempted to show, it is not without its difficulties for both surgeon and patient. I have heard one of my senior colleagues say that the best impetus he has ever had to develop useful local flaps on the lower limb is the thought of having to do a cross leg flap on an adult.

Having experienced the not inconsiderable difficulties attached to this procedure in a child, I can understand the advice of my teachers, that this is not a course to be lightly embarked upon, but once having done so, to proceed with caution.

Surgeons differ in the amount of time that they will wait before dividing the flap. Three weeks has always been thought to be ideal, but some of my teachers believe that, particularly in a child, two weeks is adequate.

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RELEASE OF BURN CONTRACTURES.

HISTORY:

At the age of nine months, this little boy was admitted to the burns unit at Red Cross Hospital, with 25% hot water burns involving the face, neck, chest, legs, arms and back. It was estimated at the time that 10% was superficial and 15% deep.

He required several skin graft operations before he was discharged home fifty days after being admitted.

He was followed up regularly at the burn clinic and then at the plastic surgery outpatient department. Soon after his discharge, it was noted that he had early contractures of his left axilla and cubital fossa. It was decided that he should continue to have regular physiotherapy and when the contractures were soft, to release them.

Almost one year to the day after his original admission with the burns he was admitted for release of the contractures.

EXAMINATION:

The child was quite well and examination of all his systems revealed nil of note. He was fit for surgery.

LOCAL EXAMINATION:

There were severe contractures of both the anterior axillary fold and the cubital fossa. Extension and abduction of the shoulder were limited to 90°, and the elbow was unable to extend more than 120°.

OPERATION:

RELEASE OF BURN CONTRACTURES BY MEANS OF MULTIPLE Z-PLASTIES.

Surgeon: Dr. L. Berkowitz.

PROCEDURE:

Two so-called "candelabra plasties" were marked out, one on the axillary band and one on the band running across the anterior aspect of the cubital fossa.

This involves two staggered Z-plasties which are transposed, as well as advancing the triangular flap which is left into a further incision, as is illustrated in the photographs.

Following transposition of all the flaps, a full release was obtained.

The flaps were sutured with 4/0 black silk sutures to the skin and 4/0 Dexon in the deeper layers.

The arm was dressed with saline-soaked gauze swabs and immobilised with a plaster slab.

POSTOPERATIVE COURSE:

The slab was kept on for one week. When the dressings were taken down, it was noted that there was good healing of the wounds except on one flap where there was a small area of breakdown along one edge. This, fortunately, soon settled down and healed without becoming septic. The child was discharged eleven days after the operation and is seen regularly in outpatients, where his release has been noted to have been maintained. He will be followed up regularly for many years to be sure that there is no adverse effect on his growth.

Preoperative.

Candelabra Plasties Planned.

Immediately Postoperative.

DISCUSSION:

The best treatment of burn contractures is obviously their prevention. This involves a number of things.

1. Efforts to ensure that superficial burns do not become deep. The prevention of infection is a very important factor here.

   A very significant factor that has become part of our burn management is tangential excision and grafting of deep partial-thickness burns. This technique is designed especially to save dermis and thereby obviously to prevent the burn from becoming any deeper.

   By practising this technique and using fairly thick skin graft a reasonable amount of dermis is retained and contractures are diminished.

2. Posture of the burnt parts is very important and is the joint responsibility of the nursing staff and the physiotherapists and occupational therapists.

   The parts are exercised as soon as it is practicable and every effort is made to maintain a normal range of joint movements.

3. A further development in burn management in recent years has been the pressure garment. This garment by exerting constant pressure on the healing and maturing scar, prevents the formation of hypertrophic scars and contractures to a large degree.

Despite all these prophylactic measures, burned children unfortunately still develop contractures and these can be very difficult and time-consuming to correct. They constantly test the ingenuity of the surgeon and therapist, both in the theatre and in attempting to manufacture splints for them, and despite great efforts on the part of all concerned, often need a few admissions to hospital before a satisfactory result is obtained.

Before embarking on surgery, it is necessary to wait six to twelve months after the burn in order to allow the scar to mature and soften.

Once the child is ready for surgery, there are a number of ways in which the problem can be tackled.

One may simply release the contracture and skin graft the defect. It is very valuable when splitting a contracture, to "fish-tail" the ends of the incision i.e. two incisions are made at each end of the incision at right angles to one another, to give the appearance of a fish's tail. This adds significantly to the amount of release obtained.

The timing of the grafting is also important. Some surgeons prefer to graft the defect immediately. Others, however, feel that by delaying grafting for a few days, the graft will be more likely to take on a relatively dry, non-bleeding surface, and the amount of release that has been obtained may be increased by placing the limb on traction for a few days.

When the grafting is done, it is preferable to use a fairly thick graft as the more dermis one can add to the wound, the less likely is it to contract on maturing.

A better technique of contracture release is to employ full-thickness cover of the defect by means of flaps.

Local flaps are obviously preferable and the most commonly used of these is the Z-plasty. In planning the local flap, it is very important to take into consideration whether one is working with normal skin or fibrous tissue covered with some epidermis. Flaps raised in the latter sort of tissue may only be very short as they lack a subdermal plexus and are very liable to ischaemic necrosis. This is what caused partial loss of one of the flaps in this case and is by no means rare.

If there is no local tissue available and the contracture release exposes tendons or joints, it may be necessary to employ a distant flap. This may either be a direct type of flap as one would use, for example, from the lateral side of the chest onto the arm, or the tissue may have to come from elsewhere, such as an abdominal tube pedicle. A point worth bearing in mind when operating on old burns scars, particularly if one is going to the trouble of using a flap, is the fact that it is believed that bacteria may remain viable in the scar tissue for many years and that the surgery may stir up an infection by disturbing the dormant organisms. For this reason, although it is difficult to prove, our patients are placed on penicillin routinely on being admitted for surgical release of burn contractures.

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TANGENTIAL EXCISION AND GRAFTING

A twenty-one year old African woman was admitted twenty-four hours after sustaining a hot water burn of the right leg.

She denied having applied anything to the wound.

PAST MEDICAL HISTORY:

She had a history of epilepsy and had last had a seizure on the day of the burn.

EXAMINATION:

General: She was pyrexial (38,6°C).

Cardiovascular System:

Pulse: 110/minute

Blood pressure: 120/80mmHg.

Respiratory System:

Nil abnormal detected.

Central Nervous System and Abdomen:

Normal.

LOCAL EXAMINATION:

There was an approximately 8% deep partial thickness burn involving the lateral half of the right lower thigh and extending onto the calf, where the burn was virtually circumferential.

The burn was superficially septic.

MANAGEMENT:

She was admitted to the Burns Unit.

She was given tetanus toxoid and placed on the following drugs:

Amoxil 250mg. eight hourly.
Penicillin 500mg. six hourly.

The burn was cleaned after a swab was taken for culture and then dressed with Betadine ointment. This dressing was changed twice a day.

SPECIAL INVESTIGATIONS:

Haemoglobin: 11,5G%.

White cell count: 9,000/cu.mm.

E.S.R.: 18mm. in first hour.

Initial burn swab grew only Staph. aureus and a light growth of psuedomonas aeruginosa.

Throat swab was negative for Beta haemolytic streptococcus.

On the fourth postburn day it was decided to take the patient to theatre.

OPERATION:

TANGENTIAL EXCISION AND GRAFTING OF ACUTE BURN.

Surgeon: Dr. L. Berkowtiz.
Assistant Surgeon: Dr. T. Cairns - Registrar.

PROCEDURE:

After the leg had been prepped with Betadine surgical scrub, the entire burn was rubbed with a dry mopping swab. There were patchy bleeding spots and it was decided to carry on with a tangential excision of the burn.

This was done using a Davies Dermatome set on a thin setting. After removing a fairly thin layer of dermis, the entire burnt area was bleeding which indicated that we were down to viable dermis.

The burn was skin-grafted from the opposite side, the skin being meshed prior to being applied.

The grafted leg was dressed with saline-soaked mopping swabs and Kerlix bandages.

The donor sites were dressed with one layer of tulle gras, then wet swabs and Kerlix bandages.

POSTOPERATIVE COURSE:

The patient continued running a mild pyrexia after the operation. On the fifth postoperative day, the dressings were removed and the grafts were found to have taken almost completely.

Despite this, the patient still had a mild pyrexia and a swab taken on removing the dressings grew Beta haemolytic streptococcus, Staph. aureus, and psuedomonas. Fortunately, these infections were obviously mild as the grafts were not adversely affected.

The patient was discharged completely healed, seven days after the operation.

Preoperative.

After Tangential Excision.

Graft Applied.

Graft Take After Five Days.

DISCUSSION:

In the last five to ten years, there have been some very significant changes in the management of burns which have led to much improved results and decrease in the mortality rate.

FLUID THERAPY:

The trend in our Burns Unit and in many of the better-known units overseas is away from early blood and plasma replacement and towards more aggressive early replacement with clear fluids.

All adults with over 15% burns are given intravenous fluids according to the following formula:

First 24 hours - 3 x weight in kg. x % burn as ml. of Plasmalyte B or Ringers lactate or normal saline.

Second 24 hours - 1 x weight in kg. x % burn as ml. of blood or plasma or 4% albumen.

The choice of what is to be used here depends on the depth of the burn and the patient's haemoglobin after rehydration. If the burn is deep and more than 10%, or the haemoglobin is low, blood is given according to the empirical formula of 1% of the blood volume for every 1% of burn, the blood volume being calculated according to the formula:

weight in kg. x 75 ml.

Monitoring these patients with central venous pressure lines has been shown to be inaccurate unless a pulmonary wedge pressure is measured at the same time. This carries with it the added dangers of a central line in the presence of a large, potentially septic wound, and has, therefore, been discarded as a routine measure.

The urine osmolality has been found to be very reliable as a means of assessing the patient's degree of hydration and is now performed routinely on all of our patients who are receiving intravenous fluids. Free osmolar output should be 30 m.osm./hour in a 70 kg. adult and the patient's fluids are titrated according to his osmolality.

Naturally, we have been discussing only fluid replacement and to this must be added the patient's normal daily requirements of 2,5 - 3,0 L./day.

There are some who feel that this regime may be too aggressive, but there have been no problems with overhydration and it must be pointed out that in, for example, the Burns Unit attached to the Plastic Surgery Department at Stanford University in San Francisco, the formula used is not 3,0 but 4,0 ml. x weight in kg. x % burn.

LOCAL APPLICATIONS:

For many years, one of the biggest problems in treating burns was that of controlling the infection of the burn itself. This had two major sequelae. It increased the depth of the burn, and added dramatically to the patient's state of ill health. Not infrequently, the infection ended in a septicaemia which was responsible for the patient's demise.

The organism most commonly responsible for this complication was Pseudomonas aeruginosa, and most Burns Units often had the characteristic Pseudomonas smell about them.

Fortunately, both for the patients and the surgeons looking after them, this is no longer the case.

Since Betadine, Flamizine and Mafylon became available and were widely used, the local control of burn sepsis has improved dramatically.

Septic burns are the exception rather than the rule today, and this fact, together with the technique of tangential excision and grafting, has led to the overall dramatic improvement in results.

These agents have two very desirable effects. They are strongly bactericidal all having essentially the same spectrum of activity, and they keep the burn moist and prevent dehydration.

Mafylon has a better penetration of eschars and is, therefore, used most often on full-thickness burns. It has the disadvantage of causing acidosis and hypernatraemia if used on large areas and this has to be watched for.

Betadine and Flamizine are very similar in their actions and as Flamizine is more than twice the price of Betadine, we tend to use Betadine as our standard burn dressing. It has a very good base which keeps the wounds moist and well lubricated.

DIET:

Another big problem in the past was the state of negative nitrogen balance that these patients got into and from which they did not recover until the burns were completely healed. It was commonplace to see patients in Burn Units literally fading away.

Some years ago, intravenous hyperalimentation was introduced for patients with chronic bowel problems such as small bowel fistulae. This method of supplementing the patient's diet has been used in treating burns, but has the very significant disadvantage that it requires a longterm central venous line in precisely the sort of patient in which one wants to avoid this.

Following extensive experience in treating burns resulting from the wars in the Middle East, Israeli surgeons have described a new regime for dietary supplementation in burned patients that we and many others feel is one of the most significant advances in burn care in recent times.

It has been estimated that an adult with 40% burns requires 350 g. of protein and 5,000 calories per day. If one compares this to the normal daily requirements of 70 g. of protein and 2,500 calories, it is easy to understand why these patients fell behind so quickly.

Using the egg diet described by the Israelis, the patients are given up to 40 eggs per day in any form that they will accept from boiled, to coddled and served as egg flips or puddings. To this is added a vitamin supplement including Vitamin B Co tabs. 2 t.d.s.
Vitamin C tabs. 500 mg. t.d.s. and
Ferrous gluconate tabs. I t.d.s.

Other dietary supplements such as Complan and Sustagen are also used.

The result of using this regime is that not only do the majority of our patients not lose weight during their stay in the Burns Unit, but we have observed that a few patients who came into hospital in a rather poor condition, have actually gained weight in the Burns Unit.

TANGENTIAL EXCISION AND GRAFTING:

This method of treating deep partial-thickness burns is the last and one of the most significant advances in burn management that I would like to discuss.

Janzekovic first described this technique in 1970, when she reported on 1600 cases treated over a period of ten years.

Tangential excision and grafting was described for use in deep partial-thickness burns. In these burns, in the zone of stasis under the coagulum on the surface of the burn, are dermal cells which are still viable although they show markedly decreased metabolic activity. If these cells are allowed to dry out, they die and the depth of the burn is increased.

This normally happens over the first seven days after the burn. If this can be prevented, however, it is possible to salvage these cells and improve the overall result.

In tangential excision, a skingraft knife is used to cut away the layers of the coagulum until punctate bleeding is observed. This denotes viable dermis and at this level, a skin graft will take.

In order to be of maximal value, the tangential excision must be done within the first seven days after the burn and the ideal time is felt to be between the third and fifth days.

There are a number of advantages to using this technique.

The patient is healed and ready for discharge quicker than by the old wait and see method.

By saving the deeper layers of the dermis, there is less contracture and the skin may assume a complete morphologic and functional regeneration. This has been shown to be particularly valuable in treating burns of the hands.

Janzekovic states that topical agents are not needed in burns under 20% because of the relatively small risk of infection in the early days after the burn. She also stresses that these agents render the differentiation between deep and superficial burns more difficult.

We are not as happy to rely on this and prefer to place all our patients on some topical agent on admission.

There are certain difficulties associated with this technique.

It is often extremely difficult to assess with any degree of accuracy the depth of a burn soon after admission. It would seem, from what I have heard, from many of my senior colleagues, that this does not become any easier over the years, and they envy those surgeons who speak with such confidence on assessing the depths of burns. In a Unit where the facilities are available, I feel that when in doubt, the patient should be taken to theatre and the burn excised. The argument may be levelled that too many patients may be grafted for nothing this way, but one has only to take a patient with a fairly extensive burn and tangentially excise and graft half of the burn and treat the other half expectantly to see the radical difference between the two sides as one waits for some weeks for the second side to heal.

There is another point that I feel very strongly about and which does not seem to be stressed sufficiently in the literature.

These patients can and do bleed profusely during the excision. One must be aware of this problem and be prepared to handle it. I have seen experienced anaesthetists caught unawares by their patients suddenly going into shock on the operating table. This is particularly of importance in children and cannot be stressed enough.

If someone who is inexperienced in this technique and has read about it in the literature, decides to attempt to treat a burnt patient by tangential excision and grafting, and is not prepared for the catastrophic bleeding that may occur, he is likely to end up with a very sick or dead patient.

The advances in burn treatment which I have described have made a tremendous difference to the management of these unfortunate people.

Our burn units are now clean smelling places where well nourished patients may be found awaiting their early treatment or covered with skin graft and the old sight of large areas of granulations have become the exception rather then the rule.

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FRACTURED MANDIBLE

This patient, a thirty-eight year old woman, presented two days after being involved in a motor vehicle accident.

Her only complaints were pain and swelling of the jaw.

EXAMINATION:

Examination of her jaw revealed swelling and tenderness in the region of the right angle and the anterior half of the left body of the mandible.

X-Rays confirmed the fact that she had fractured her mandible.

There were two fractures; a favourable fracture of the right angle and an unfavourable fracture of the left body between the two premolars. The only teeth present were the lower incisors and premolars and a root of 37 or 38.

She was otherwise well and fit for an anaesthetic.

OPERATION:

LOWER BORDER WIRING OF DOUBLE FRACTURES OF THE MANDIBLE.

Surgeon:	Dr. L. Berkowitz.
Assistant Surgeon:	Dr. T. Rousseau (Registrar).

PROCEDURE:

The fractures were approached via inframandibular incisions, great care being taken not to damage the mandibular branch of the facial nerve.

The fractures were cleared of periosteum and then wired firmly, using a single wire for the left fracture and two wires to create a triangle of forces on the right.

The wounds were then closed with 4/0 chromic catgut and 4/0 black silk sutures.

The teeth were then cleaned and the root of the lower left molar was removed.

A circumdental wire was then placed from the canine to the first molar on the left side of the mandible, in order to hold the fracture stable at its upper border. This was done despite the fact that the molar was fairly loose. I felt that there was a chance that the tooth might survive and could always be extracted at a later date if it became necessary.

POSTOPERATIVE COURSE:

She was placed on Amoxil 250mg eight hourly and given a supply of analgesics, Oramond mouthwash tablets and Complan.

When she was seen one week postoperatively, she informed me that the tooth that I had attempted to preserve had fallen out and with it the wire I had placed round it. She had developed some local sepsis on the base of the dead tooth and this soon settled down.

She was followed up for some weeks thereafter and was discharged healed.

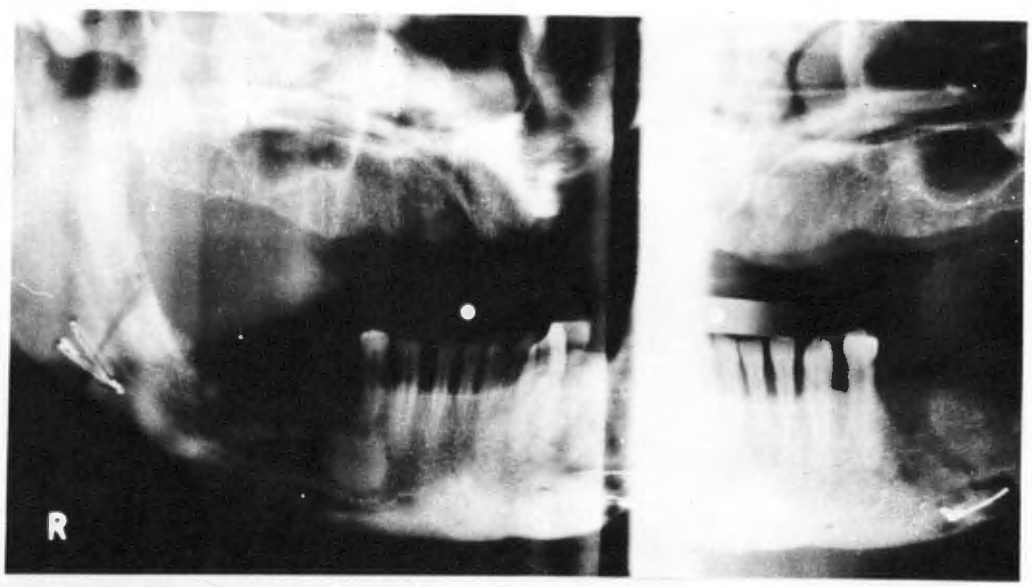
Fracture at Right Angle of Mandible.

Fracture Wired.

Circumdental Wire.

Fracture of Left Body of Mandible.

Fracture Wired.



Postoperative Panorex X-Ray.

DISCUSSION:

MANAGEMENT OF THE PATIENT WITH A FRACTURED MANDIBLE:

General Factors:

1) Preservation of the Airway:

This is of paramount importance in managing these patients. In the majority of fractures it is not a problem as the patients are usually fully conscious and able to preserve their own airways.

It becomes very important, however, in patients who are unconscious and in those who have a double fracture of the anterior mandible. These patients are unable to protect their own airways and this should be done for them by placing them in the prone position or inserting an oral airway.

Rarely a tracheostomy is required, but if indicated, there should be no hesitation in doing one.

2) The arrest of haemhorrage:

This is not usually a problem in uncomplicated fractures of the mandible and haemostasis usually occurs spontaneously. Occasionally, there may be brisk bleeding from a severed inferior dental artery and the treatment is to reduce the fracture.

3) Resuscitation:

Shock in a patient with a fracture of the mandible is due to some other cause such as a major gunshot injury or unassociated injury.

4) Prevention of Infection:

These fractures are all technically compound and are all treated with antibiotics, usually Tetracycline or penicillin.

5) Control of Pain:

Oral analgesics will usually suffice and are obviously the treatment of choice if the patient is going to be treated as an outpatient, as most of ours are.

6) Temporary Immobilisation:

If, for some reason, the fracture is not going to be treated immediately, as for example if Gunning splints need to be made, the patient can be given temporary relief by making use of the old but still very useful method of a barrel bandage.

Local Factors:

1) Removal of Gross Debris:

Loose teeth, pieces of bone, dentures and any other foreign bodies should be removed from the mouth to prevent them being inhaled.

2) Suture of Wounds:

If there is to be any delay in treating an externally compound fracture, the skin wound should be closed early.

MANAGEMENT OF THE MANDIBLE ITSELF:

When deciding on how to treat the fractured mandible, there are a number of factors that one should consider.

1) The Site of the Fracture:

A fracture of the neck of the mandible should always be immobilised for at least three weeks in order to prevent necrosis of the head and the possibility of osteoarthritis in the temperomandibular joint.

A symphiseal or parasymphiseal fracture should be immobilised by direct lower border wiring because the "bucket handle" effect at the anterior end of the mandible will result in nonunion if not immobilised rigidly.

Fractures elsewhere in the mandible such as at the angle or in the body may, under certain circumstances, be treated conservatively. This will be discussed later.

It is therefore highly relevant to know the site of the fracture.

2) The type of Fracture:

Theoretically, fractures of the mandible may be divided into closed and compound. As they are virtually all compound into the mouth, this is really of academic interest only as they are all treated as compound fractures.

However, another classification which is highly relevant is that of the direction of the fracture line.

Fractures of the mandible may be divided into favourable and unfavourable fractures.

This is related to the direction of the fracture line in both the vertical and the horizontal plane and is also related to the muscle attachments at that particular part of the mandible that is involved.

In a favourable fracture, the line of the fracture and the direction of the muscle pull is such that the fracture tends to remain reduced, while in an unfavourable fracture, the forces acting on the fracture tend to separate the fragments.

A favourable fracture which is not displaced and which is not complicated by some feature demanding immobilisation, such as a second, symphiseal fracture, may be treated conservatively, while an unfavourable fracture demands reduction and immobilisation.

3) Whether teeth are involved in the fracture or not:

It has been taught that if there is a tooth in the fracture line it must be removed.

This is not necessarily the case. If the fracture actually passes through the root of the tooth and the viability of the tooth is seriously in doubt, then it is best to remove the tooth.

However, if the fracture lies to one side of the tooth and the tooth is still fairly well embedded in the alveolus, we feel that it is acceptable to leave the tooth in situ and watch it.

If there is any evidence later on of sepsis, the tooth can always be removed.

The presence of rotten teeth in the mouth unrelated to the fracture is entirely another question and these should always be removed.

In fact, when we have a patient with a fractured mandible and rotten, carious teeth in the mouth, we prefer to take the patient to theatre, and under a general anaesthetic, to clear all the rotten teeth and generally clean out the mouth and then to go back a day or two later to reduce and fix the fracture, when there is far less chance of sepsis complicating the result.

4) The Presence or Absence of Teeth:

This information is of basic importance in deciding on the method of treatment to be used. Not only is it necessary to know whether the patient has teeth or not, but also which teeth are present, if any. The presence of a few molars is of no therapeutic value.

The importance of teeth in management will be discussed in greater detail later.

5) The Age of the Patient:

Fractures of the mandible in children require special attention because one cannot use ordinary interdental wiring as this would pull out the teeth. In children one has to use specially made cap splints which are made of German silver and are glued to the teeth and then joined together by wires or elastic bands.

In the elderly the question of dentures plays a part in ones decision. An edentulous person who does not normally wear dentures and presents with a fracture that is minimally displaced with a small step on the alveolus, may be allowed to swing, that is, to receive no treatment as the slight malalignment that will result will be of no importance to the patient's function.

If the patient wears dentures, however, it is very important to correct and immobilise the fracture so that the patient will be able to continue wearing his dentures without any trouble.

6) The General Health of the Patient:

This is a factor which may not be neglected when assessing the patient.

Whereas one would not hesitate to perform intermaxillary fixation on a healthy, fully conscious individual, it would obviously not be the treatment of choice in an unconscious patient who is likely to vomit at any time.

In such a patient, if it is essential to fix the fracture early one would choose to do so by performing a direct wiring of the fracture so as to keep the mouth open and the airway protected.

Techniques of Immobilisation:

1) No Treatment:

As I have mentioned above, there are instances where it is quite permissible to do nothing more than give the patient a supply of antibiotics and analgesics and observe him at regular intervals.

The edentulous patient who does not wear dentures and has a minimally displaced fracture may be treated conservatively.

If the patient has teeth and has a favourable fracture with little displacement and is still in good occlusion, it is not always essential to immobilise the jaw.

2) Intermaxillary Fixation:

i) Patients with sufficient teeth:

There are a number of different techniques available for managing fractured mandibles in the presence of sufficient teeth.

a. Modified Gilmer inter dental wiring:

Stainless steel wires of 25 guage are applied, ideally, to the first upper and lower molars and premolars, combined with a central eyelet wire around the upper and lower incisions. These wires are then twisted together, making absolutely sure that the teeth are in occlusion while the wires are being tightened.

b) Eyelet Wiring:

This is a modification of the above technique where, instead of single Gilmer wires being used laterally, eyelets are used throughout.

c) Arch Bars:

Sometimes due to a delay in seeking attention, a patient presents for treatment of his fractured mandible relatively late. When one comes to reduce and immobilise the fracture one may find that it is not possible to obtain a normal occlusion due to muscle spasm.

Arch bars are then applied. These firm wire splints are wired to every tooth both upper and lower, and are then connected to each other with elastic bands. This elastic traction acting over one to two days, is very powerful and almost invariably succeeds in pulling the fragments into occlusion. Once this has been achieved, the elastic bands are replaced with wires, which are then left on for the usual six weeks.

d) Cap Splints:

As I have mentioned above, it is not possible to use ordinary interdental wiring in children with deciduous teeth as the force involved is sufficient to pull the teeth out by the roots in a very short while.

One then has to make use of cap splints.

Cap Splints are also of use in treating adult fractures. They are very strong and are well anchored. They are particularly useful when there are only a few teeth present. However, in order to include these sophisticated splints in one's armamentarium, one requires the services of a skilled dental technician and these are not always available.

ii) Patients with insufficient or no teeth:

For these patients, use is made of Gunning type splints which may either be made from the patient's dentures if he has any, and they have not been broken in the accident, or from dental impressions taken especially for the purpose.

These splints are then wired to the mandible and maxilla and may then be connected to each other by wires or, if difficulty is encountered in obtaining occlusion because of spasm, by elastic bands as in the arch bar technique.

The splints are made with a gap in the front which facilitates eating.

3. Direct or Lower Border Wiring:

This technique is occasionally used in conjunction with the other methods and sometimes is the only method employed.

Direct wiring does not give a rigid, stable fixation of the fracture but serves only to align the fragments.

In favourable fractures at the angle of the mandible with "kickup" one has to reduce the fracture by the direct approach and wire the fracture directly in order to maintain the position.

Symphiseal and parasymphiseal fractures have a tendency to nonunion because of the potential "bucket-handling effect" which acts on them, and it is our policy to do lower border wiring on all of these fractures.

Thin, edentulous mandibles with mildly displaced fractures may be treated by direct wiring to obtain alignment of the fragments and then be allowed to swing.

ANAESTHESIA.

Most of the patients who have teeth and require interdental wiring are treated under dental block anaesthesia.

Those requiring splints, or direct wiring or extraction of teeth as part of the process of cleaning up the mouth are done under general anaesthesia using a naso-tracheal tube. The patients always have throat packs inserted and these are removed at the end of the procedure prior to the jaws being fixed together.

POSTOPERATIVE MANAGEMENT:

Until the patients are completely awake, they are carefully watched for any sign of wanting to vomit, and a wire cutter is kept at the patients bedside in case it should become necessary to open the jaws in a hurry.

I have obviously not discussed all the methods available for the treatment of fractured mandibles, but have described those that are routinely in use in our department. We see large numbers of patients with fractured mandibles every year due largely to the high incidence of interpersonal violence in the Western Cape.

By using these techniques which are relatively simple compared to the many sophisticated methods described in the literature, we are able to achieve a high degree of good results. In analysing 909 fractures of the mandible treated at Groote Schuur Hospital over a five year period, Melmed and Koonin found an incidence of good results of between 89 and 95 percent.

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FRACTURES OF THE MIDDLE THIRD OF THE FACE.

This patient was admitted to the accident unit, Groote Schuur hospital after being assaulted by a gang of thugs.

EXAMINATION ON ADMISSION:

The patient was unconscious and bleeding from the mouth.

Cardiovascular System:

Pulse: 96/min.

Blood Pressure: 100/55 mm.Hg.

Respiratory System:

Air entry was decreased on the right and some rhonchi were present.

Abdomen:

There were no abnormal signs and the urine was clear.

Central Nervous System:

The patient was unconscious and not responding to painful stimuli.

The pupils were equal and reacting to light.

All reflexes were present and equal.

There was no bleeding from the ears.

LOCAL EXAMINATION:

The face was very swollen and there were bilateral periorbital haemotomata. Clinically there was a very mobile middle third fracture of the face.

The eyes were not damaged and there were no hyphaemata present. There was no evidence of C.S.F. rhinorrhoea.

MANAGEMENT:

An intravenous infusion of Resusol was started and X-Rays of chest, mandible, skull and facial bones were ordered.

By the time I was called in to see the patient, he was fully conscious and co-operative and the only significant injuries still requiring treatment were the facial fractures.

My examination confirmed the above findings. The facial swelling was severe and he was only just able to open his eyes.

The upper jaw was edentulous.

There was a very mobile fracture of the central pyramid and a suggestion of fractures of the lateral orbital walls as well.

The nose was clinically fractured.

There was bilateral infraorbital nerve anaesthesia, and the patient complained of some degree of trismus.

It was not possible to test eyeball mobility due to the swelling.

X-RAYS:

Skull, chest and mandible were all normal. Facial views confirmed the presence of Le Fort II and III fractures.

DIAGNOSIS:

The diagnosis was therefore that of Le Fort II and III fractures of the middle third of the face, with minimal posterior displacement. As the patient had no upper teeth, it was impossible to assess the degree of open bite.

MANAGEMENT:

The patient was placed on Amoxil 250 mg. 8 hourly and admitted to the ward for surgery, once the facial swelling had decreased somewhat.

The airway was completely patent and there was no indication for tracheostomy.

It was decided that in view of the fact that there was no obvious dishing of the face, the plan of action would be to reduce the fractures by the direct approach and achieve cranio-maxillary fixation. At surgery it would be decided whether there was any indication for cranio-mandibular fixation, in which event impressions for an upper intraoral acrylic splint would be taken.

Four days after admission the patient was ready for surgery.

OPERATION:

ELEVATION AND WIRING OF LE FORT II AND III FRACTURES.

Surgeon: Dr. L. Berkowitz.
Assistant Surgeon: Dr. T. Cairns (Registrar)

ANAESTHETIC:

This was by routine endotracheal anaesthesia using nitrous oxide, oxygen and Halothane following induction with Alfathesin and Scoline.

PROCEDURE:

A bilateral Gillies lift was performed via the temporal approach. The depressed malar fractures were elevated considerably by this manouevre.

The fractures of the lateral orbital margins were then explored via crow's feet incisions and wired in good position.

The infra-orbital margins were then explored via S-shaped muscle splitting incisions.

Double fractures were present on both infra-orbital margins and these were wired with one wire passing from the lateral fragment to the medial fragment compressing the middle fragment between them.

At this stage, the two malar bones were quite stable, and the middle third of the face felt fairly stable, although it could be rocked slightly.

It was therefore decided to explore the fronto-nasal fracture to see whether it did not also require wiring.

The nasal bridge was approached via a V-shaped incision joining the medial ends of the infra-orbital incisions.

Once the skin flaps were raised, however, it was apparent that the periosteum was in tact and the underlying fractures were undisplaced and stable and I decided against further intervention.

Finally, the floors of both orbits were explored to rule out any tethering of the orbital contents.

The wounds were then closed with 4/0 chromic catgut and 6/0 interrupted black sutures, except the infra-orbital incision which was also closed with subcuticular 4/0 Nylon.

Chloromycetin eye ointment was placed in both eyes and all the wounds. The face was dressed with one square of tulle-gras over each eye, covered by thick pads of cotton gauze soaked in saline and held firmly in place by crepe bandages.

POSTOPERATIVE COURSE:

The patient remained well and apyrexial. The dressings were removed after twenty-four hours and the wounds were then kept moist with Chloromycetin ointment for the next forty-eight hours.

The sutures were removed on the fifth postoperative day when the wounds were found to be healed.

The postoperative x-rays confirmed that the fractures were in a satisfactory position.

On inserting the patient's upper denture, it was noted that he had a slightly open bite on the left. It was felt that this could be corrected with a new upper denture which was ordered.

When last seen at our outpatient department, all the wounds had settled down well and the patient's occlusion was quite normal using his new dentures. The bony contour of his face was back to its normal appearance.

On Admission.

X-Rays Showing Le Fort II and III Fractures.

Fracture of Right Lateral Orbital Wall Wired.

Right Infraorbital Fractures Wired.

Exploration of Nasal Fracture.

Left Infraorbital Fractures Wired

Fracture of Left Lateral Orbital Wall Wired.

Postoperative X-Rays.

One Week Postoperative.

DISCUSSION:

Aetiology:

Fractures of the middle third of the face are major injuries and are usually sustained in motor vehicle accidents.

In the Cape Peninsula, due to the amount of interpersonal violence that is a part of the way of life, a large proportion of the Le Fort fractures we see are the result of assault.

Classification:

Le Fort classified fractures of the middle third of the face into three types.

Le Fort I. The hard palate is detached from the rest of the maxillae.

Le Fort II. The central pyramid of the face, consisting of both maxillae and the nasal bones, becomes separated from the rest of the face.

This whole segment usually becomes displaced bachwards and downwards and results in an open bite, because the molars occlude before the other teeth.

Le Fort III. In this fracture, also known as cranio-facial disjunction, the bones of the middle portion of the face become completely detached from the cranium at the level of the floor of the orbits.

Although it is possible for these fractures to occur as separate clinical entities as they have been defined here, they are far more often seen as combinations, the most common being that of a Le Fort II and III, which is what my patient had.

Clinical Findings:

Because these fractures are the result of severe violence and are therefore often associated with other injuries which are far more likely to endanger the patient's life, they are frequently not diagnosed in the early phase of the patient's care. However, if the diagnosis is kept in mind by the casualty officer, it is not difficult to make.

There are a number of telltale signs to look for.

These patients frequently have bilateral periorbital haemotomata and we are taught that if this sign is present always to look for a middle third fracture.

If there has been significant displacement of the fracture, the classical "dish-face" deformity will be present. The face is longer than it should be and the middle third can clearly be seen to be more posteriorly situated than it should be.

If the patient has his own teeth, it will be apparent that he has an open bite. This occurs, because, as the pyramid moves backwards it also moves downwards and the whole section of the face is therefore tilted. The molars then come into occlusion with one another before the anterior teeth on closing the mouth and the patient is unable to completely close his mouth hence the phrase "open-bite".

If the fracture has extended through the ethmoid sinuses as it usually does, there will be evidence of C.S.F. rhinorrhoea.

A very helpful but by no means infallible test for this fracture is to test for mobility of the hard palate. One holds the cranium steady with the left hand and, pressing upwards on the hard palate with the index finger of the right hand, one feels for mobility of the palate. This test is not always easy to interpret in a doubtful case, but in a loose fracture of the middle third of the face, it is helpful in making a positive diagnosis.

TREATMENT - EMERGENCY TREATMENT.

There are two important things to keep in mind in the early care of these patients. Patient's with Le Fort II and III fractures are likely to develop a meningitis because of the fractures of the ethmoid bones, and if there is a C.S.F. rhinorrhoea, they should be placed on the triple antibiotic regime of Penicillin, Chloromycetin and Sulfadiazine.

My patient had no rhinorrhoea, and it was therefore, decided to place him on one antibiotic only, and observe him carefully.

The second thing to bear in mind is that of the airway. These fractures are often associated with fractures of the mandible and, if this is severe, the airway may be compromised.

If there is any doubt as to the patient's ability to maintain his own airway a tracheostomy should be done at once. All too frequently, patients have become severely ill or been lost because of the failure to do a tracheostomy in time.

Once the tracheostomy has been performed, there is no need to proceed with the definitive treatment of the fractures with any haste. There is only one indication for emergency treatment of the fractures proper and that is the presence of uncontrollable bleeding from the fractures. If this situation is encountered, often the only way to stop the bleeding is to reduce and fix the fractures, after which the bleeding usually stops dramatically.

If possible at this time, one should X-ray the cervical spine to exclude fractures here.

TREATMENT - DEFINITIVE TREATMENT:

The choice of procedures depends on the extent of the fractures.

In my patient, there was minimal displacement, and it was sufficient to treat the fractures by cranio-maxillary fixation suspending the fractured portion of the face from the lateral orbital walls. It is sometimes necessary, in severe cases, to wire the nasal bones together and also occasionally to reconstitute the medial canthi. Fortunately this was not necessary in my patient.

If the displacement is more severe and the occlusion is altered, particularly if the mandible is also fractured, it is necessary after reducing the fractures, to obtain cranio-mandibular fixation.

What this amounts to essentially, is fixing the two jaws together with the teeth in proper occlusion, and then fixing the face to the cranium.

The intermaxillary fixation is achieved by the routine methods used for fractured mandibles. Interdental wiring with Risden or eyelet wires or arch bars, if the patient has sufficient teeth, or by means of Gunning-type splints if he is edentulous.

In our department we use the box-frame method of achieving cranio-mandibular fixation. Moules pins are placed in the supraorbital ridges and in the mandible, and connected to each other by means of universal joints and steel rods. The facial fracture is loosened and checked for reduction and the bars tightened, thereby holding the facial fractures firmly in place against the base of the skull.

The box-frame and interdental wiring are usually left on for a period of six weeks.

Another method sometimes employed to obtain cranio-mandibular fixation is to drill holes in the frontal processes of the zygoma on each side and, passing wires through these holes and down to the mouth, fix the interdental wires to the cranium.

For surgeons who are familiar with these fractures, their treatment is fairly straight forward and good results are usually obtained.

However, if these fractures are missed initially, they result in most unfortunate cosmetic deformities which are very difficult to correct without major cranio-facial surgery.

Hence the importance of stressing to young surgeons who run our Casualty departments the need to always bear these fractures in mind.

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AUGMENTATION MAMMOPLASTY.

The patient, a European female aged 48 years, presented to me requesting an augmentation mammoplasty.

HISTORY.

The patient was a gravida one para one and said that following the birth of her child her breasts had become progressively smaller and more ptotic, and this had increased with advancing age.

She was a healthy woman, with an active sex life, and felt that the fact that she did not have "normal" large and firm breasts, was detrimental to her relationship with her husband and was causing her some unhappiness.

Her past medical history did not reveal anything of note.

EXAMINATION:

General:

A healthy woman for her age, and not overweight.

Cardiovascular System:

Pulse:	80/regular.
Blood Pressure:	110/60 mmHg.
Auscultation:	Normal

Respiratory System:

Nil abnormal detected.

Abdomen:

Nil abnormal detected.

LOCAL EXAMINATION:

The breasts were atrophic and ptotic, but symmetrical. There were no nodules or masses present in either breast.

The nipples were in the normal position on the breast i.e. facing slightly upward and outward and had not sagged to below the inframammary fold.

Her chest configuration was normal, without any pectus excavatum or flaring of the rib margin.

For these reasons it was felt that she would be a good candidate for augmentation mammoplasty.

SPECIAL INVESTIGATIONS:

Haemoglobin: 12,5 G%.

In view of the patient's excellent general health and the absence of any abnormal findings on clinical examination, the routine (for patients over 40 years of age) chest X-Ray and ECG were not performed.

OPERATION:

Surgeon: Dr. L. Berkowitz.

PROCEDURE:

A routine augmentation mammoplasty, via linear infra-areolar incisions was performed.

A cavity was created on each side, large enough to accommodate the Heyer-Schulte gel-filled 200 cc. prostheses with ease.

Adequate haemostasis was obtained, and the wounds were closed using interrupted 2/0 Dexon sutures in the deep layers, and a subcuticular 4/0 Dexon suture for the skin.

Light gauze dressings were placed on the wounds, covering the Steristrips which were used to augment the skin closure.

The breasts were then covered with cotton wool and dressed firmly with a crepe bandage.

POSTOPERATIVE COURSE:

The patient's postoperative course was uneventful.

She remained apyrexial and complained of only minimal discomfort.

She was discharged on the third postoperative day.

On the eighth postoperative day, she was seen in our outpatient department and it was noticed that the wound on the right appeared to be superficially septic, with slight redness around the wound and serous discharge.

The wound was cleaned with Savlon and dressed with T.B. Co. and cotton gauze and the patient was placed on a course of Erythromycin 250 mg. six-hourly, for one week.

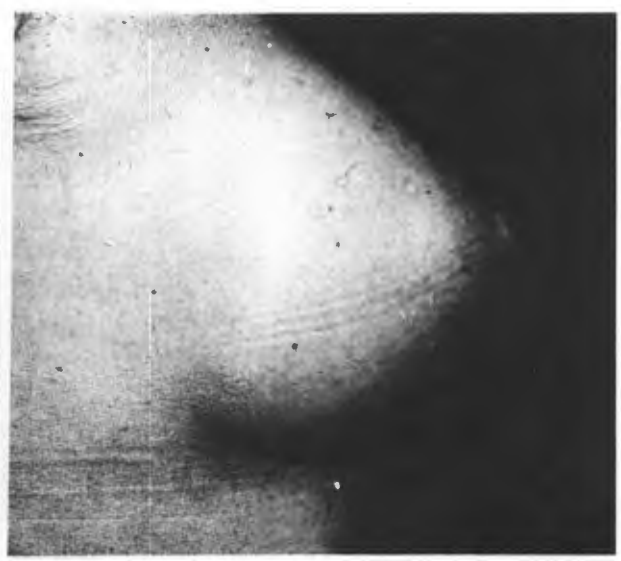
This superficial wound sepsis soon settled down and three weeks after the operation, the patient was discharged, to be seen again in six months time.

Six months later, she was seen by a colleague in my absence, and it was noted that the right breast was slightly firmer than the left and she was asked to come again after six months.

When she was seen again in September 1976, both breasts were found to be very firm and contracted and had the typical "tennis ball" appearance which is the bane of the plastic surgeon's life.

Since then, two attempts have been made to break the capsules by manipulation, with some degree of success and she will be seen at regular intervals for further manipulations.

Preoperative.



Two Weeks Postoperative.

Contracted Capsules After One Year.

Softer Breasts After Closed Rupture of Capsules.

DISCUSSION:

Augmentation mammoplasty is essentially a cosmetic operation carried out on otherwise healthy women (apart from those which follow subcutaneous mastectomy), in whom the only pathology requiring treatment rests in the psyche.

By mentioning this fact ab initio, it is not my intention to imply that this is perhaps an unnecessary or frivolous operation, but rather to stress that the very fact that one is performing an operation on an otherwise healthy person, and an operation which is not without its complications, places a very great responsibility on the plastic surgeon not only to perform the surgery to the best of his ability to ensure a good result, but also to assess very carefully which patients he is going to perform the operation on, and also to inform the patient fully regarding the possible complications and their sequelae.

When requesting an augmentation mammoplasty, the patient desires the following result:

Breasts which will have
- an improved silhouette
- a natural appearance
- be pleasant to feel.

While the early postoperative result will often fulfill all these requirements, provided that the operation is well done and that the correct operation for the particular patient has been done, the later result often leaves much to be desired, and it is this problem that I wish to discuss.

PREOPERATIVE EVALUATION:

1. The patient's physical, emotional and social needs all have to be considered. The physical problem is self-evident. However, more difficult to assess is the psychological effect that the small breasts are having on the patient and also whether the problem stems from the patient herself, or whether in fact she is quite happy, but her husband/lover feels that the breasts are too small and are affecting their sex life.

These factors are terribly important to assess because if the breast problem is merely a symptom of a more complex psycho-social one, the operation is unlikely to result in a happy, satisfied patient or surgeon.
It has been suggested to me by a senior colleague, that a cosmetic operation never saved a marriage, and I am inclined to agree with this viewpoint. In fact, this patient was divorced, not six months following surgery, and although she denied it at the time, I am inclined to think that this was an example of someone trying to solve a marital problem by having an operation.

2. Physical Examination

General Examination:

The operation should not be done on women in poor general health, nor on young women who have not yet fully developed.

One must, therefore, ensure that the patient does not have any major illness which might make anaesthesia risky or mitigate against a good result, for example, a bleeding tendency.

Local Examination:

The following factors are important in assessing the patient for augmentation mammoplasty.

a) Patient's height, weight and chest contour - to give guidance to the size of the implant to use (there, one must obviously also consider the patient's desires regarding the degree of enlargement required).

Chest contour is very important as a patient with pectus excavatum or a thin chest with prominent ribs, is less likely to have a good result than a patient with a chest of normal configuration which is well covered.

b) THE BREASTS THEMSELVES -

One must take note of:

i) The size of the nipple and areola - very large nipples and areola do not give a good result and often have to be reduced.

ii) Asymmetry of the breasts - if indeed asymmetry is present, this might be one of the few indications for using inflatable prostheses.

iii) The position of the nipple relative to the inframammary fold - if the nipple is above the inframammary fold and pointing upwards and outwards, an augmentation alone will give a satisfactory result. If the breast is very ptotic, the nipple is pointing downwards and lies below the inframammary fold, doing an augmentation alone will produce a poor result, with the breast hanging down off the lower edge of the prosthesis, giving a "banana" shaped breast.

In this case one must do some form of mastopexy operation, plus augmentation if indicated.

iv) The nulliparous breast with glandular tissue inferior to the nipple but no ptosis. Here, the prosthesis should be placed higher than usual.

3. The Prostheses.

The choice of prostheses is an individual one.

Inflatable prostheses have an advantage when dealing with asymmetrical breasts, hypoplastic breasts and slightly ptotic breasts, according to some authors. However, a deflation incidence of up to 35% in some series is reported and one author used eight, all of which he subsequently removed, one because of a very prominent edge, and the rest for deflation.

I favour the gel-filled prosthesis and this view is supported in the literature by such authors as Thomas R. Broadbent.

The early tendency to enlarge the breasts excessively seems to have disappeared and 170 - 240 ml. prostheses are adequate for most patients.

4. The Implantation Site:

The question of subpectoral or suprapectoral insertion has been the subject of much discussion in the literature.

Indications for subpectoral insertion are -

- Patients with small superior hemispheres where the nipples point upwards. Subpectoral insertion makes the nipples point downwards.
- prominent ribs in the manubrial area.
- thin chest wall and visible bony cage.

A disadvantage of this approach is that on raising the arms, the implants may displace markedly upwards.

This technique is not used by my teachers, and I therefore have no experience of it and feel that there is not much to recommend it.

5. The operation itself:

Two complications which have major sequelae in this operation are infection and haemotoma.

a) Infection:

Gross sepsis in the postoperative period must result in removal of the prosthesis with obvious dissatisfaction for the patient and surgeon. It is, therefore, essential to be meticulous with asepsis before and during the operation.

The use of prophylactic antibiotics is not recommended, either locally or systematically, the former because it may add to the chemical irritation which might influence subsequent capsular contracture, and the latter because it is unlikely to prevent infection occuring if there is good cause for this, and should rather by held until some sign of infection shows itself.

b) Bleeding:

It is essential to be absolutely meticulous in obtaining haemostasis and preventing bleeding during this operation because postoperative haemotoma is probably the greatest cause of fibrous capsular formation and contracture following augmentation mammoplasty.

Bleeding may be diminished by -

good exposure and illumination, preferably with a cold light attached to a retractor.

proper dissection in fascial planes.

avoid tearing or cutting muscle fibres.

drainage.

The subject of drainage is a vexed one and a constant point of discussion amongst plastic surgeons. Although it might sound trite, one is either a "drainer" or not, depending on one's own experiences and the experiences of others.

Many surgeons will tell one that their views differ as their experiences change i.e. a "non-drainer" might start draining his augmentation mammoplasties after having a particular large postoperative haemotoma develop in one of his patients, while another surgeon will report that he has had a series of haemotomata despite using drains, and therefore has stopped using them. At this stage of my career, after having some unpleasant experiences in cases where I did not use drains, I now subscribe to the adage "I have never regretted using a drain, while I have regretted not using one".

I now use 1/4" Portavac suction drains, inserted laterally and left lying in the lateral and upper portions of the cavity, and placed on continuous suction by means of a Stedmans or Dräger pump once the patient is back in the ward. The drains are generally removed 48 hours post-operatively.

6. Postoperative Complications:

I have mentioned infection and bleeding.

Wound disruption with exposure of Implant:

This may be due to:

inadequate wound closure

superficial wound sepsis

an inadequate pocket to contain the prosthesis with resultant wound closure under tension.

an important consideration here is the placing of the incision. If the incision is placed in the inframammary fold (when it will cause a poor cosmetic result by being exposed under a bikini top) the entire weight of the prosthesis may rest on the wound and impair the blood supply to the skin causing disruption.

It is, therefore, advisable to place the incision a few centimetres above the inframammary fold, and to create a pocket 1 - 5 cms. below this incision, in order to allow the prosthesis to rest on sound tissue.

Displacement of the Implant:

This may result from malposition at the time of the operation or from subsequent ptosis. In order to prevent this complication, the earlier gel-filled prostheses were supplied with Dacron fixation patches on the posterior surface in order to allow the prosthesis to fix to pectoralis fascia. However, the incidence of fibrous capsular contracture appears to be higher with these prostheses and they are no longer in vogue. A not inconsiderable problem with these prostheses is also the extreme difficulty experienced in removing them, should this become necessary.

Palpable edges and valves.

This problem is more common with the use of inflatable prostheses.

Fibrous Capsular Contracture:

This is the most significant complication resulting in a poor, longterm overall result, and I would like to discuss it at some length.

After implantation of a foreign material, normal healing is by the formation of a fibrous capsule. The form of the implant and the qualities of its surface will influence this reaction. The thickness of the fibrous capsule is proportional to the chemical irritation of the implant, the mechanical irritation resulting from its movement and inflammation secondary to trauma, infection and haemorrhage.

The progressive scar contracture may be dependent on the following factors:

i. Excessive operative scarring.

ii. Undrained postoperative seromata.

iii. Persistent secretion caused by impurities on the prosthesis.

iv. Postoperative haemotomata.

v. Late haemorrhage.

In the average case, contracture diminishes or ceases after approximately 6 months with maturation and lessening cellularity in the encircling membrane.

Toward the end of the initial short period of collagen organisation the envelope of scar tissue contracts, diminishing or folding a compressible prosthesis of fixed volume to accentuate and project its edge and cause buckling, folding and distortion around it.

The spherical force of this progressive fibroblastic contracture can form spheres from inserted hemispheres, hemi-elliptoids or truncated cones because a sphere has the smallest surface area of any shape to contain a given volume.

This force may displace the prostheses in any direction despite Dacron patches and good strapping for 3 weeks postoperatively.

It has been noted that the wide dissection necessary for subcutaneous mastectomy has not prevented these late contractures.

Freeman has divided these cases into three clinical types.

A. Early Mild Contractures:

Here, the process is completed by 3-6 months. It occurs in small thin-walled breasts.

B. Slowly Progressive Contractures:

The process continues and progresses slowly over 1-2 years. This usually occurs after subcutaneous mastectomy or reconstruction of the breast with a stormy postoperative course.

C. Acute Fulminating Type:

This classification does not, however, make allowance for the cases not at all infrequent, where the breasts are fine and soft for 1-2 years and suddenly, sometimes without apparent cause, sometimes related to trauma, become firm. This may be unilateral or bilateral and seem to be related to post-traumatic haematoma in the breast.

The treatment of this complication has been, for a long time, reoperation, division of the fibrous capsule into a base and a dome and enlargement of the cavity, with the reinsertion of the same or smaller prostheses.

In recent years, much has been written regarding the value of inserting triamcinolone into the cavity either at the time of surgery when removing the drain, or at reoperation. Although there have been some convincing articles supporting this method of treatment, many surgeons remain unimpressed with its value.

The most recent development has been the technique of breaking the capsule by manipulation of the breast. This appears to work well in most cases and can be repeated as often as is necessary without the necessity for hospitalisation and general anaesthesia.

Following the line of thought that the best way to prevent capsular contraction and its unsightly and uncomfortable sequelae, is to keep the cavity containing the prosthesis as large as possible, it would appear that the old ideas of instructing the patient to severely restrict her activity and shoulder movements in the early postoperative period were wrong, and that she should, with the initial help of the surgeon be advised to move the prostheses regularly, massaging the prosthesis around the chest, in order to keep the cavity as large as possible.

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REDUCTION MAMMOPLASTY.

HISTORY:

The patient, a coloured female aged forty years, presented in our outpatient department complaining of pain and extreme discomfort in both breasts of many years standing.

She said that her breasts had always been large and had increased in size following each of her three pregnancies.

She suffered pain on the right side of her neck and back, found that her brassiere straps cut into her shoulders, and because of the very large breasts had great difficulty in fitting clothes. She pointed out that her breasts were of such dimensions that, despite buying the very best brassieres available, she was unable to achieve adequate support and relief of her discomfort.

PAST HISTORY:

1962 - Haemorrhoidectomy.
1966 - Bilateral Trendelenburg and strip for varicose veins.

She had not had any significant illnesses and was not on any regular medication.

EXAMINATION:

The patient was a fit woman, slightly overweight for her height, weighing 75,4 Kg. at 1534 cm. in height.

Cardiovascular System:

Pulse: 72/min. and regular

Blood Pressure: 120/80 mmHg.

Auscultation: Normal heart sounds.

Respiratory System:

Nil abnormal detected.

LOCAL EXAMINATION:

The breasts were very large, the right being bigger than the left.

The suprasternal notch to nipple distance was 36 cm. on right and left.

There were no palpable nodules in either breast.

There was no evidence of inframammary intertrigo.

SPECIAL INVESTIGATIONS:

Haemoglobin:	13 G%
Chest X-ray and E.C.G.:	Both normal.
Preoperative Mammogram:	Revealed evidence of trivial adenosis in the right upper outer quadrant and nil else.

OPERATION:

Surgeon:	Dr. L. Berkowitz.
Assistant Surgeon:	Dr. J. Crosier (Registrar)

PREOPERATIVE PREPARATION:

The day before surgery the patient was marked with a water resistant pen.

The standard Wise pattern was used for marking the semi-circular site for the areola. The new site for the nipple was marked at 20,5 cm. from the suprasternal notch on a line joining the midclavicular point to the nipple.

Once the semi-circular marking had been made with the pattern, the rest of the markings were made freehand by careful measurement and positioning of the breast.

The midline below the xiphisternum was marked. The vertical line from midclavicular point to the nipple was continued downwards and the point where it intersected the inframammary fold was marked. This point was 11,0 cm. from the midline.

By folding the breast first laterally and then medially lines 4,0 cm. long were drawn from the areola marking at such an angle that they would meet, after excision of breast tissue, at the point previously marked on the inframammary fold.

The inframammary incision line was then marked, just above the fold running from an appropriate point just lateral to the midline and brought upwards onto the breast on the lateral side to end at a point which was at the same horizontal level as the medial end of the line.

These two points were then joined to the previously marked vertical limbs of the "T" by curved lines, convex upwards.

ANAESTHESIA:

This was routine endotracheal anaesthesia using nitrous oxide, oxygen and Halothane, following induction with Pentothal and Scoline.

The patient was supine on the table, in a semi-sitting position, with the hands placed under the buttox and the elbows slightly flexed. The arms were protected by placing large pads of cottonwool between the arms and the operating table.

An intravenous line was introduced.

PROCEDURE:

After preparing the skin and draping the patient, the markings were completed.

The new nipple-areola complex was marked using a circular device 5,0 cm. in diameter.

Two pedicles were then marked, a vertical inferior pedicle as described by McCissock, running from nipple to inframammary fold and a medially based pedicle at approximately 120° to the inferior pedicle, running from nipple to the radial markings for areolar and vertical incision.

The planned skin incisions were then infiltrated with POR-8 (one ampoule in 30,0 ccs. of saline) which was also incorporated into the space between breast and pectoralis fascia, in order to diminish bleeding.

The two pedicles were de-epithelialised using a No. 10 B-P blade.

The excess breast tissue was now excised, creating pedicles approximately 2,5 - 3,0 cms. thick. Special attention was given to excising tissue deep to the new site for the nipple-areola complex, lateral to the upper pedicle.

The breast consisted almost entirely of fat, with only occasionally sheets of breast tissue, all of which appeared normal.

In order to excise enough tissue to allow what remained to be comfortably accomodated by the skin brassiere, it was necessary to trim the pedicles to the point where it was felt that any further excision would certainly endanger the blood supply to the nipple. However, when the excision had been completed, the nipples appeared pink, with a good capillary blush.

3 lbs. 8 ozs. was removed from the right breast and 3 lbs. 2 ozs. from the left.

There was very little bleeding during the procedure, and after careful haemostasis using electrocoagulation the wounds were closed using 3/0 Vicryl for the deep subcutaneous sutures and 4/0 Dexon subcuticular sutures to close all the skin wounds.

At the end of the operation, the breasts had a satisfactory shape, the right being still slightly larger than the left.

Corrugated drains were inserted, from the medial end of the wound, exiting 2,0 cms. from the lateral end of the inframammary wound. 4/0 Black silk mattress sutures were placed in the skin at this point, to be tied after removing the drains.

The inframammary and vertical wounds were further supported with Steristrips, and the wounds were dressed with cotton gauze, cottonwool and two six inch crepe bandages, which were passed around the trunk and over the shoulders to give brassiere type support.

POSTOPERATIVE COURSE:

The postoperative course was uneventful. The patient had a mild postoperative pyrexia which settled by the second postoperative day when the dressings were removed for the first time. There were two features of note:

Despite the fact that haemostasis had been as thorough and complete as possible, and despite the use of drains, there was some bruising of the lateral element of the right breast. There was, however, no collection of haemotoma and this settled down spontaneously over the following two weeks.

On the left, it was evident that there had been some ischaemia of the areola where there was an area 1,5 X 1 cm. at the inferior margin which was obviously ischaemic and going to necrose.

Apart from this, the wounds were healthy.

The drains were shortened by 5cms. and the wounds redressed using tulle-gras, cotton gauze and crepe bandages.

The dressings were changed daily thereafter and the drains were removed on the fourth postoperative day without having drained very much.

The small area of necrosis on the left areola remained uninfected and slowly showed signs of healing.

There was also evidence of minor dehiscence at the junction of the vertical incision with areolar and the inframammary incision.

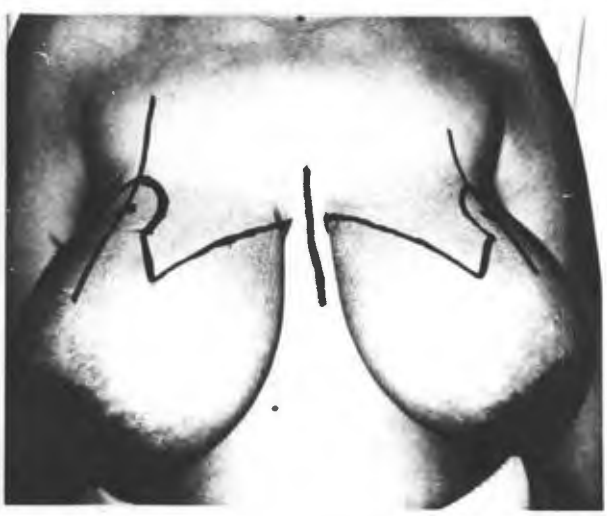
The patient was discharged on the seventh postoperative day.

During the next four weeks, all the areas of minor skin loss healed with simple dressings and the only sign was a small depression at the lower edge of the left areola.

Histology of the breast tissue revealed no abnormality.

Both the patient and I were very pleased with the result.

Preoperative.



Preoperative Markings.

Two Months
Postoperative.

Left Breast Presenting.

Right Breast Presenting.

DISCUSSION:

After looking at the preoperative photographs of this patient it is apparent that she suffered from what Strombeck has called "macromastia" and which he defines as "the breast size at which 50%of women experience somatic discomfort because of the weight of the breast, and which has led to the women in question seeking medical advice for surgery to reduce the breasts and where at operation a reduction of at least 200g. is made from at least one breast".

It is further apparent that she was a most deserving case for surgery and that a gratifying result was obtained after removal of a very significant amount of tissue, despite the complication of partial nipple loss.

There were two points in this patient which detracted from an overall very satisfactory result from the surgeon's point of view.

The first was that in retrospect, it was felt that slightly more tissue should have been removed from the lateral element of the right breast. This, however, is not felt to be terribly significant.

The second and more significant was the partial areola loss on the left, and this will be discussed later.

Breast reduction has become one of the more popular operations requested of the plastic surgeon, and certainly in my department is the most commonly requested cosmetic operation.

The reasons for these women requesting surgery are well-known and include backache, pain in the neck and shoulders from brassiere straps digging in, inability to obtain relief with any available form of brassiere and inability to find clothes to fit them and self-consciousness about the size of the breasts, particularly among the younger sufferers.

It is my impression that because of the tremendous relief mainly physical, but also psychological obtained, these patients are among the most grateful we have. They are almost invariably satisfied with the result of the operation and are generally unconcerned about complications which are worrying to the surgeon, so glad are they to be rid of their burden.

There are two main methods of performing reduction mammoplasty.

1) Subtotal amputation of the breast, possibly with refashioning of the remnant and free transplantation of the nipple.

   The operation was first described by Thorek in 1922.

   This operation has two distinct disadvantages. Firstly, the function of the breast is completely lost and secondly, there is a significant chance of losing the nipple.

   The only apparent indication for using this operation today would seem to be in the very large-breasted woman, although even this is not so, as will be discussed shortly.

2) Reduction of the gland combined with transposition of the nipple, which thus retains its connection with the remnant of the mammary parenchyma. In principle the breast function can be maintained.

SKIN RESECTION:

In most of the earlier operations, the skin resection was not planned in advance. The skin and subcutaneous tissue were raised from the gland, which was then shaped and the nipple transposed, following which the skin was trimmed accordingly.

Among the surgeons who described operations of this type were Aubert (1923), Passot (1925), Maliniac (1934), Ragnall (1946) and one of the best-known, Biesenberger (1925).

The stories told to young plastic surgeons in training about disastrous skin loss in these operations are legend, and it is not surprising therefore, that my knowledge of these procedures is from the literature and anecdotes only, as this type of operation is no longer performed by any plastic surgeon with whom I have been associated or acquainted.

Aufricht in 1949, described a procedure which allowed for preoperative planning of the amount of skin to be excised, and this was followed in 1956 by Wise's description of his skin pattern which, with minor modifications, is in wide use today.

To reduce the risk of circulatory distrubances in the lower corners of the skin flap using the Wise pattern, a triangular flap based on the inframammary fold may be used, and variations on this theme have been described by Hanrahan, May and Penn.

An operation which is useful for the reasonably bulky and ptotic breast is that described by Dufourmental and Mouly in 1961.

The two surgeons who have probably contributed the most to making available techniques of breast reduction which give consistently acceptable results and can be mastered by young surgeons without years of experience are Skoog and Strombeck.

Using the Wise pattern, and using single or double pedicles respectively for transposing the nipple, their operations have achieved wide popularity either in their original form or with minor modifications.

As I have described previously, the technique which is popular in the department where I have trained uses basically the Wise pattern, although this is used only to mark the new site for the areola, the rest of the markings being done freehand in order to suit each individual patient.

An inferior vertical pedicle is used, as described by McCissock, running from inframammary fold to areola.

A second, medially-based pedicle is also used, at approx. 120° to the vertical pedicle. This arrangement allows the nipple to rotate up to its new position without any trouble and does not result in retracted nipples as is not uncommon with the Strombeck procedure.

This procedure has been used with great success by a number of surgeons of varying degrees of competence and experience and has been found useful in all grades of macromastia.

I know of one case where the inferior pedicle was 36 cms. long and there was no nipple loss.

Despite that, it is obvious that, unfortunately, occasionally there is some degree of areola loss as occurred in my patient. The explanation is, I believe, that because of the extremely large size of the breast, and the need to trim the breast and fatty tissue adequately so that it would fit comfortably in the new skin brassiere, it was necessary to make the pedicles very thin and in so doing, the blood supply to the nipples was compromised.

Fortunately, the loss was minimal and healed spontaneously.

I use a corrugated drain which passes from medial to lateral and is usually removed on the second postoperative day..

In this case, despite the use of a drain, the patient developed some bruising of the right breast but this settled spontaneously.

It will be noted that all suturing was performed with subcutaneous Vicryl and Dexon. This gives more than adequate support and a most satisfactory result.

In order to prevent superficial skin loss at the two ends of the vertical scar where the tension is concentrated, these incisions are made with a blade slanted away from the skin edge to leave additional dermis with which to suture the wound.

A further point of great importance is the question of the length of the vertical scar.

The Wise pattern makes these lines 5 cm. long. However, if these lines are carefully measured at the end of the operation, one often finds that they are longer than 5 cm. and if left, will increase in length over the next 6 - 9 months to up to 8 or 9 cms.

This will result in a breast with the nipple sited not at the summit of the breast where it should be, but on the superior surface, pointing over the patient's shoulder to the great distress of both patient and surgeon.

In order to prevent this, I now plan these lines only 4 cms. long and check at the end of the operation that the vertical incision line is in fact only 4 cms. long. If it is longer, the flaps are trimmed accordingly.

Breast reduction today, if planned and executed with care and consideration for the points made here, can give extremely pleasing results both functionally and cosmetically to the great satisfaction of patient and surgeon.

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RHYTIDECTOMY.

This middle-aged woman gave an unusual but acceptable reason for wanting a face lift. She told me that she was in the throes of getting a divorce and found herself in the position of having to go out to work after many years as a housewife. She had been employed in earlier years as a model and was in a position to re-enter this field if she could improve her appearance. She insisted that she was not basically interested in looking younger for the sake of purevanity and that her motive in seeking this surgery was entirely an economic one. My senior colleagues and I were inclined to believe her and felt that this was an acceptable reason for seeking cosmetic surgery and so the surgery was arranged.

HISTORY:

There was no past history of note.

EXAMINATION:

General Examination:

She was an extremely fit woman for her age and had the bodily habitus of and moved like a much younger person.

Cardiovascular System:

Pulse: 80/min. and regular.
Blood Pressure: 110/60 mm.Hg.
Auscultation: normal heart sounds.

Respiratory System:

Good air entry was present. Nil abnormal detected.

Abdomen:

Nil abnormal detected.

LOCAL EXAMINATION:

There was ptosis of both upper and lower lids and some herniation of the fat pads in both upper and lower lids.

The facial skin was smooth and slightly ptotic, the major ptosis being in the region of the neck and jawline.

SPECIAL INVESTIGATIONS:

Chest X-Ray	-	Normal
E.C.G.	-	tracing within normal limits.
Haemoglobin	-	11,5 G%

Preoperative photographs were taken.

OPERATION:

RHYTIDECTOMY AND BLEPHAROPLASTY.

Surgeon: Dr. L. Berkowitz.

Assistant Surgeon: Dr. G. Morrison (Consultant).

PROCEDURE:

A hypotensive anaesthetic was employed.

Upper and lower lid blepharoplasty was performed via a curved elliptical excision on the upper lid and a marginal incision on the lower lid. Minimal amounts of fat were removed from the fat pads and a very narrow sliver of skin needed to be removed on the lower lids.

The upper lid wounds were closed with subcuticular 4/0 nylon and the lower lids with interrupted 6/0 black silk.

The rhytidectomy was performed via reasonably standard incisions running in front of the ear and up and forwards onto the scalp. The incision was carried around the ear right in the groove between lobule and neck skin, along the back of the ear halfway up the ear and then onto the mastoid area where the incision was turned sharply down and carried downwards and backwards for approximately three centimetres.

The area undermined included the cheeks up to the malar eminences, along the jawline and down onto the neck, not joining across the midline.

The forehead was not undermined.

During the operation, great care was taken to keep the dissection at the correct level in the subcutaneous tissue so as not to go too deep and divide the facial nerve, and not too superficial and jeopardise the blood supply to the skin flaps.

When the dissection was complete, the anaesthetist was requested to bring the blood pressure back to the normal level to assist in achieving absolute haemostasis. Once the wounds were dry, closure was begun. The initial tension sutures were placed, using 2/0 Vicryl, at the points where the wounds turned forwards and backwards above and behind the ear respectively.

The wounds were now closed using 4/0 Vicryl in the hair-line and 6/0 black silk after the appropriate amounts of skin had been removed.

The eyelids were covered with a layer of tulle-gras and then iced saline packs. The rest of the wounds were covered with saline-soaked gauze swabs and the head was then wrapped in cottonwool and a pressure dressing of crepe bandage was applied.

The iced saline packs to eyelids were continued for twenty-four hours.

Her postoperative course was satisfactory. After forty-eight hours, the bulky dressings were removed, and a small haemotoma was found to be present on the right. This was aspirated and 22 ml. of blood were removed.

On the third postoperative day, the medial lower eyelid sutures were removed and on the fifth day, the rest of the eyelid sutures were removed and the patient was discharged.

When I saw the patient in outpatients one week after the operation, the wounds were healing well except for an area 1,0 x 1,0 cm. behind the left ear where it looked as if there might be some superficial loss.

On the tenth day the patient was seen again and all the remaining sutures were removed. The wounds, including the suspicious area behind the left ear had healed. There was a small seroma present on the left side of the neck. This was aspirated yielding 5 ml. of bloody fluid.

When the patient was last seen, six weeks after the operation, she was well, the scars were fading and the early impression was that of a definite improvement on the preoperative appearance.

Preoperative.

Blepharoplasty Markings.

Blepharoplasty Completed.

Six Weeks Postoperative.

DISCUSSION:

The facelift operation is one that falls entirely in the realm of cosmetic procedures and serves no object but that of the patient's vanity.

It is an operation that requires a great deal of patience and hard work on the part of the surgeon and it is certainly not without its complications, which add to the surgeons concern during and after the operation.

Probably the most important factor in providing for a successful and satisfactory result is the selection of the patient. This certainly plays a part in all cosmetic surgery, but poor selection by the surgeon prior to this operation is almost bound to result in a dissatisfied patient who becomes a veritable millstone around the neck of the surgeon.

Selection:

In selecting the patient, there are two aspects to consider.

Firstly, the psychological one. The patient's motive for wanting the operation is very important and has been stressed to me on a number of occasions by my teachers. The patient who wants the operation for pure reasons of vanity is considered to be the best potential candidate. The person who expresses the hope that by having this operation, they will be able to save a failing marriage or overcome a major psychological problem, is the one to be avoided. These people expect miracles to be brought about by the surgery. As this is obviously not possible, all that is likely to happen by operating on them is that the surgeon will find himself the new object of the patient's unhappiness and frustrations.

While this might seem to be a very uncomromising attitude towards the potential facelift candidate, I have had an attitude of extreme caution taught to me by my teachers in plastic surgery. One of my senior colleagues points out that for every facelift that he performs, he turns away five or six as unsuitable.

Once having decided that a patient is suitable for the operation on psychological grounds, it is necessary to consider the patient's physical suitability for the procedure.

In their book on Cosmetic Facial Surgery, Rees and Wood-Smith define the following characteristics as constituting the ideal candidate.

The patient should be in her mid-forties. She should be thin and have prominent malar eminences and mandibular ridges. The chin should be strong, and the natural cervico-mental angle should be approaching 90° in the erect position. It is important that the skin should not be too wrinkled. A full head of hair is very helpful in hiding the scars in the early postoperative phase.

My patient fitted this description very well and for this reason was considered a good candidate.

PREOPERATIVE PREPARATION:

The night be fore surgery, the patient is asked to wash her hair with Betadine soap and this is repeated on the day of surgery.

It is very important to have good preoperative photographs preferably taken by a professional photographer using standardised lighting.

Another factor to investigate prior to surgery is whether or not the patient has any bleeding tendency. A careful history should elicit any relevant details. Some authors believe that one should not operate on a woman just prior to or during her menses and if she is on the pill, this should be stopped for two weeks prior to surgery.

ANAESTHETIC:

The question of what form of anaesthetic to use is an interesting one. We, in South Africa, are very spoiled by having, on the whole, an excellent anaesthetic service both in hospital practice and in private practice. Because of this and the fact that hospitalisation fees are not yet as exorbitantly expensive as they are in many countries overseas, we tend to do all of our cosmetic surgery under general anaesthesia, combined with hypotension in certain procedures such as rhytidectomy and corrective rhinoplasty.

In America, particularly, but also in some countries on the Continent, local or regional anaesthesia is very popular for these procedures. Regarding the facelift, the protagonists of this technique say that there is less bleeding, the patients are able to co-operate, and most important, the patients may go home immediately after surgery, and be treated as outpatients.

What they neglect to point out is to what degree these patients are sedated in order to facilitate the surgery. We feel that in fact these patients are virtually being anaesthetised without having the benefit of a proper anaesthetic with controlled ventilation.

Skoog, in his magnificent book on Plastic Surgery, describes how his patients have a regional block together with intravenous Pentothal. To me, this virtually means uncontrolled anaesthesia and I certainly feel much safer operating on a patient under the expert care of an anaesthetist.

Hypotensive anaesthesia is not without risks, but if practised by experiensed anaesthetists with careful monitoring of the patient and,as important, if it is used only for specifically indicated operations, it should be without serious side effects most of the time.

THE OPERATION:

This operation, as I have said earlier, is not without its difficulties and complications which assume particular importance in the mind of the surgeon because he is operating on an healthy woman and is, or should be, very aware of the harm that he may do should things go seriously wrong.

In order to avoid these unpleasant complications, there are a few points worth considering during the operation.

In planning the incisions, it is important that, the incision should run round the ear from anterior to posterior surfaces exactly in the groove between lobule and neck skin.
If this is not done, the lobule is often pulled down onto the neck postoperatively and this looks very unsightly and requires a further operation to correct.

When raising the flaps, there are a few points worth keeping in mind.

At the upper end of the incision, one should ensure that the dissection is kept below the level of the superficial temporal fascia to avoid damaging the hair follicles in the temple and resulting in distressing postoperative alopecia. Once this plane has been established, the dissection should be moved to the anterior border of the ear and these two planes then joined up.

This will prevent one from going too deep and damaging deeper structures. This procedure should also be followed behind the ear.

At this point it is appropriate for me to point out that I have been taught to carry out the dissection of the flaps at the level of the subcutaneous fat and superficial to the Platysma and the superficial fascia. Skoog's operation differs from this in that he recommends going deep to these structures. He points out that doing the operation his way takes one closer to the deeper, important structures such as the facial nerve, but that with care these should always be avoided. This might well hold true in the hands of an experienced surgeon, but is much more likely to lead a young surgeon into trouble.

The reason for Skoog's different approach is that he believes that, in order to get a completely satisfactory result, it is necessary to plicate the superficial fascia and the Platysma. This view is not held by the surgeons that have been responsible for my training and this method is not practised by them.

During the dissection the facial nerve is particularly at risk of being damaged at certain spots and great care should be exercised here. These areas include the following:

1) Over the body of the mandible at the point where the facial artery crosses and the mandibular branch of the facial nerve becomes superficial.

2) Over the malar eminence where the buccal, opthalmic and zygomatic branches of the nerve become superficial and are particularly liable to damage.

3) At the midpoint of the patch of temple skin between the outer canthus of the eye and the superior auricular angle.

Permanent damage to the facial nerve is fortunately very rare but paresis occasionally occurs and is usually temporary.

It is particularly important to look for any sign of facial weakness preoperatively and point these out to the patient.

This is obviously very important in patients who are presenting for secondary facial surgery.

Once the dissection is complete, haemostasis must be obtained. The anaesthetist is asked to bring the blood pressure back to normal levels and once this has been achieved all sources of bleeding are carefully sought and dealt with.

Whether or not to use drains is up to the individual surgeon. If the wounds are dry and haemostasis is complete, the wounds may be closed without drains. If small haemotomata occur later, they may be aspirated. Some surgeons feel that they not infrequently get postoperative haematomas in spite of using drains and even go so far as to say that they have occasionally seen haematomas develop immediately after the drains have been removed. For these reasons, many surgeons do not drain their facelifts.

On rare occasions, there may be some sloughing of the skin usually in the mastoid region. These wounds usually heal without any problem and are hidden by the hair.

Another distressing but fortunately rare complication of this operation is hair loss. This usually occurs in the temporal region and adjacent to incisions in the hair bearing area. Rees and Wood-Smith say that it usually occurs in patients who are prone to develop alopecia. It is also due to making the skin flaps too thin.

In the postoperative phase, once the wounds have healed, the patient often feels that the result is not as dramatic as she would have liked. It is at this time that the preoperative photographs are of great value to remind oneself and the patient what the preoperative appearance was.

The case I have described did well and her early result is, I feel, a significant improvement that should last for some time.

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CORRECTIVE RHINOPLASTY.

This twenty-two year old woman presented in our outpatient department requesting surgical correction of her rather ugly nose.

She said that she had always been aware of and selfconscious about her nose, and felt that surgery could do a lot for her.

She seemed a fairly stable person, although a significant fact in her medical history was that she was asthmatic. However, vanity alone appeared to be the motivating factor in requesting surgery and as we agreed that surgery could do much to improve her looks, the necessary arrangements were made.

EXAMINATION:

The patient was a fit, young woman and a full examination revealed nil of note.

LOCAL EXAMINATION:

The nose was long and broad.
She had a marked hump and a drooping tip.
The septum was noted to be central.

OPERATION:

CORRECTIVE RHINOPLASTY.

Surgeon: Dr. L. Berkowitz
Assistant Surgeon: Dr. R.M. Strover (Consultant)

PROCEDURE:

An hypotensive anaesthetic was used.

Via an intercartilaginous incision on the right side, the hump was removed with a chisel.

The infracture was then performed, care being taken to wash and suck out the saw tracks to remove all bone chips.

The upper lateral cartilages were then trimmed.

Rim incisions were then made and the alar cartilages exposed. These were then trimmed to decrease the bulk and fine down the shape of the tip of the nose. The knees of the alar cartilages were then sutured together to raise the height of the tip.

Approximately 3 mm. were trimmed off the end of the nasal septum.

The mucosa was then carefully sutured with 4/0 chromic catgut.

Calgitex was used to plug the nasal cavities and a Plaster of Paris shield was applied to protect the nose, after the nose had been carefully strapped to assist in maintaining the new shape.

POSTOPERATIVE COURSE:

By the following day the patient had developed bilateral peri-orbital haemotomata, but these were not very severe.

On the second postoperative day the plugs were removed and the patient was discharged.

On the tenth postoperative day the plaster was removed.

The early impression of the nose was satisfactory.

At two months postoperatively, the nose seemed to be settling down well and was an improvement on the preoperative appearance, although both the patient and I felt that the tip was too large.

Preoperative.

Six Weeks Postoperative.

DISCUSSION:

Of all the surgical techniques that the aspirant plastic surgeon has to learn, this is probably the most difficult.

The reasons for this are essentially the following.

Until one has seen a good number of these operations, the anatomy is not easy to picture and fully understand. Following the actual surgical procedures is also not easy because of the small aperture through which one has to observe while the surgeon is busy. The operation needs to be carried out with great attention to detail as very slight adjustments may make a very big difference to the end result.

When contemplating a corrective rhinoplasty, selecting a suitable patient is very important and is considered by some authors to be more important than in any other plastic operation. Here, as in a facelift, the psychological aspect cannot be overstressed. The patient who is unhappy about the fact that he or she has an ugly nose and wishes to look more attractive is much to be preferred to the patient whose interest in having the surgery is related to more involved psychological problems. These patients will expect the surgeon to solve all their personal problems by giving them a beautiful nose and, needless to say, they are bound to be disappointed.

Once one has decided that the patient is suitable, one has then to define exactly what the defects of the nose are and what will be required to correct them. The surgeon must be aware of the limitations of the operation and how they will apply to each individual case. In each case, one must decide, what can be done to improve the patient's looks and, more important, one must establish exactly what the patient wants. It is not an infrequent occurence for a patient to walk into the surgeon's rooms and present him with a photograph and say "that is what I want to look like". The responsibility then lies with the surgeon to point out that it is not always possible nor desirable to attempt to create the nose that the patient thinks would suit him or her. Although it may be difficult for some patients to accept the fact, it has to be pointed out to them that, other then taking their basic desires into account, the surgeon must be allowed to create the nose which he thinks will best suit the individual's face. One cannot expect the patient to understand, without it being carefully explained to him, that it is not always possible to change only one feature of the nose, as is sometimes the case when the patient requests that only the tip or the hump should be changed.

In assessing the nose, there are a number of factors that may influence the end result.

These include the thickness of the nasal bones, the presence or absence of the nasion, the thickness and position of the septum. This latter is a particularly important factor as we shall discuss later. A further point which is very important is the type of skin covering the tip. In the patient with thick oily skin, a good result cannot be expected because this skin is very difficult to work with and makes it very difficult to fashion a fine tip.

Finally, the initial examination must be completed by having photographs taken.

Regarding the operation itself: In the United States of America, local anaesthesia is very popular for this procedure. The method that is employed however, consists of a combination of local anaesthetic and heavy sedation which, in my view, is tantamount to giving the patient and unsupervised anaesthetic. As we are very fortunate in having excellent anaesthetic services in this country we prefer to do our rhinoplasties under general anaesthetic with hypotension if the anaesthetist is familiar with this procedure. This greatly facilitates the surgery as it keeps the already limited field of vision free.

If the preoperative assessment has shown the need for a submucous resection of the septum, this is usually done first. Two points concerning this procedure which have been stressed to me very strongly by my teachers, are the site of the incision through which to do this procedure, and how much septum to remove.

The incision commonly used is an L-shaped incision opening inferiorly to allow for drainage postoperatively. Another point to bear in mind is to be very careful when stripping the mucosa off the septum on the intact side.

Creating a hole here, opposite the incision, can result in a septal perforation.

The path of the inspired air is normally along the floor of the nose and it is at this level that the obstruction to airflow must be sought and corrected. It has been pointed out to me on a number of occasions that many surgeons make the mistake of removing a large portion of the septum in the superior part. This has two distinct diasadvantages. It does not relieve the obstruction which is lower down and it often results in a significant loss of support for the bridge of the nose. This is a very serious problem for which there is no ready solution.

Once one has lost the septal support for the dorsum of the nose it is very difficult to regain.

The correct way to perform this operation then is to remove the lower half of the septum, always being sure to leave an L-shaped strut of septum to support the dorsum and maintain the height of the nose.

The clearance must then be carried back as far as is necessary to clear the airway, extending right back to the nasopharynx if necessary.

Now the rhinoplasty proper may start.

Millard states that a definite order of operative steps should be followed in corrective rhinoplasty. He suggests that the tip, hump and septum are completed and the lining trimmed before the osteotomy is undertaken. His reason for this is that by diminishing the time lag between this procedure, which is responsible for so much bruising, and the application of the pressure dressings, the bruising will be diminished.

It is very difficult for a young surgeon in my position to disagree with as experienced a rhinoplastist as Dr. Millard, but this suggested sequence of steps does not agree with what I have been taught and I feel that his advice may be questioned. I have learned that after the hump has been removed and the infracture done, one then has to adjust the length of the nose, if necessary, and decide exactly what needs to be done to the tip.

It therefore seems inadvisable to me to do the fine adjustments of the tip before the gross adjustment to the basic shape of the nose by the infracture.

Further points which have been stressed to me regarding rhinoplasty include the following :

1. When making the intercartilaginous incisions, one must be sure to join up the two sides so that the septum is free from the columella.

2. After freeing the skin off the dorsum of the nose, it is important to clear the top of the septum of all loose tissue as this may, if left behind at the end of the operation, contribute to a parrot beak deformity.

3. When planning and executing the hump removal, one must be sure to take it high enough up to the glabellar region or one will not achieve an asthetic line from forehead onto bridge.

4. Prior to performing the sawcuts laterally for the infracture one must be sure to clear the periosteum very carefully from the nasal bones, going up to above the medial canthus. When doing the sawcuts, it is essential to keep the saw at all times parallel to the anterior surface of the maxilla and as low down on the nasal bones as possible, that is, at the angle of junction between the nose and the maxilla. The reason for this is that, if the cuts are made too high, there will be a very unsightly step following the infracture which is very difficult to correct once it has occurred.

5. After the sawcuts have been completed, one should wash out the cuts to ensure that all of the bone chips have been removed. If these are left behind, they may grow and form unpleasant and unsightly bumps on the side of the nose necessitating a secondary procedure.

Another important point regarding the sawcuts is that one should concentrate on breaking through with the saw at the top end of the cut first. If this does not happen, the bone might fracture too low down when the infracture is performed and give an unsatisfactory result.

After dividing the upper lateral cartilages from the septum with a cartilage scissors, the nasal bones are separated from the septum by means of an osteotome. When this has been achieved, the infracture is done using the osteotome.

The way in which this is done is also important. When fracturing the bone one must support the bones laterally so that the fracture occurs high up at the top end of the sawcut and not too low down.

Once the infracture is complete, one may go on to trimming the septum if it is necessary and then to do the tip plasty.

When trimming the alar cartilages, it is very important to ensure that one does not remove too much as only a slight miscalculation here can have disastrous effects on the result obtained.

6. When the septum has been trimmed and the tip plasty done, the upper lateral cartilage is trimmed, if necessary, and the wounds closed.

   One of the points that has been stressed to me most strongly regarding this operation is the necessity to preserve every possible piece of lining. Some of the worst disasters following corrective rhinoplasty have apparently been contracture of airways due to inadequate remaining lining. This complication is very serious and very difficult and time consuming to correct.

   It is also essential to close the mucosal incisions very carefully at the end of the procedure. If this is not done, distortion may occur with healing and detract from the final result.

7. At the end of the procedure it is wise to suck all of the blood out of the nose paying particular attention to the posterior airway and the naso pharynx.

   It is often not appreciated that large clots can collect here during the operation. It is a spot which is very difficult for the anaesthetist to get at with his sucker and, if left behind, can conceiveably be aspirated by the patient on waking up.

8. The nose is packed using Calgitex or BIPP plugs. There are a number of reasons for this:

a) To prevent the formation of synechiae
b) to keep the mucosa in contact with the septum if a submucous resection has been performed and thereby assist in preventing a septal haematoma and
c) to ensure that the nasal bones do not adhere to the septum at the apex of the nose giving a very sharp bridge.

9. The nose may now be strapped with narrow Elastoplast. This helps in keeping the skin, which was dissected free from the dorsum, in close contact with the dorsum during healing. It also helps to maintain the new shape of the tip.

   A plaster shield is finally applied.

POSTOPERATIVE CARE:

The plugs are usually removed on the second postoperative day. The patient is then advised against blowing the nose and is given a bottle of sodium bicarbonate solution and a small syringe with which to irrigate the noe if it becomes crusty.

The patient is also given a tube of Chloromycetin ointment This is used to keep the inside of the vestibule lubricated and prevent crusting.

As I said at the beginning of this discussion, the technique of corrective rhinoplasty is not easy to learn and while one is doing so, it certainly succeeds in reminding one of the limitations of one's surgical abilities. However, it is very interesting surgery and certainly worth the effort of perfecting.

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ABDOMINAL LIPECTOMY.

The patient, a Coloured female aged 30 years, presented to me in January, 1975, complaining of excessively lax abdominal skin, and ugly striae following three pregnancies.

As she did not intend having any more children, and was very concerned about the appearance of her abdomen, she requested corrective surgery.

PAST MEDICAL HISTORY

The only features of note were that she was allergic to penicillin and had had a retained placenta following the birth of her third and last child.

EXAMINATION

General:

She was a fit, healthy young woman who, although she was unfortunately not weighed, was not overweight at all.

Cardiovascular System:

Blood Pressure: 120/80 mmHg.
Pulse: 72/ min.

LOCAL EXAMINATION:

The patient had what could well be described as a "prune belly".
The abdominal skin was extremely lax and could in fact be lifted up approx. 6 cms. from the abdominal wall.
There was extremely little fat present beneath the skin.

SPECIAL INVESTIGATIONS

Haemoglobin: 16 G%

PREOPERATIVE PREPARATION:

The groin was shaved the day before surgery.

OPERATION

PAULE REGNAULT ABDOMINAL LIPECTOMY

Surgeon: Dr. L. Berkowitz.

Assistant Surgeon: Dr. B. Binnewald - Consultant.

ANAESTHETIC:

Routine endotracheal anaesthesia with Thiopentone induction and maintenance with Nitrous Oxide and Oxygen and Halothane.

POSITION:

Supine on the operating table with arms at the sides. An operating table which was capable of being broken in the middle was used.

PROCEDURE:

An abdominoplasty, using the Paule Regnault "W" technique was performed.

MARKINGS:

The patient was marked on the operating table and not preoperatively, while standing, as recommended by Regnault. With care, it is felt that one can achieve symmetry by marking the patient on the table.

The marking was started in the midline at the superior hairline of the pubis. Regnault, in fact, stresses that this point should be 2-3cms. below the hairline, to avoid pulling the hairline up too far, and I feel that, although this did not result in this case, it is an important point and should be borne in mind.

The markings were then continued laterally and downward, towards the inguinal ligament for approximately 8 cms. and then passed laterally and upward, just below the ligament, to a point below the anterior, superior iliac spine and approximately 16 cms. from the lowest point of the "W",

From here, the line was carried medially to just above the umbilicus.

TECHNIQUE:

Por - 8, diluted one ampoule to 30 ml. of saline, was infiltrated along all the proposed incision lines and under the flap.

The incisions were initially made along the inferior markings and the flap raised. Careful haemostasis by means of electrocoagulation and ligation was achieved throughout the dissection.

The dissection was carried up to the xiphisternum in the midline and onto the rib margin laterally, after the umbilicus had been circumcised, and left attached to the abdominal wall on a pedicle.

When the dissection was complete, and haemostasis achieved, the table was flexed to allow the patient's hips to flex approx. 100° - 120°.

The flap was then drawn down and it was noted that if divided along the initial superior marking, the wounds would close nicely with no tension.

A heavy 2/0 Dexon suture was placed in the midline as a marking suture. The new site for the umbilicus was then marked and a horizontal marquise 1,5 cm. long excised in the midline. The umbilicus was then passed through this wound by means of a silk suture which had previously been placed through the skin of the umbilicus.

Closure was then obtained in two layers using Dexon 3/0 for interrupted deep sutures, and 4/0 Dexon subcuticular sutures to the skin.

Two corrugated drains, one on either side, were used and sutured in situ with black silk sutures.

The umbilicus was sutured with 4/0 Dexon subcuticular sutures and 6/0 black silk sutures to the skin.

After cleaning the wound, additional skin support was obtained by means of Steristrips.

The abdomen was covered in cotton wool over the gauze dressings, and supported with Elastoplast placed diagonally in a criss-cross fashion from flank to opposite thigh.

The patient was placed on her bed in the operating theatre with her hips still flexed by means of pillows under the knees.

Estimated blood loss was 50 ml. and no blood was added to the intravenous infusion of Ringers lactate.

It was not necessary in this case to plicate the recti.

POSTOPERATIVE PROGRESS:

The patient was well postoperatively. She developed a mild pyrexia (38°C) on the third postoperative day, but this settled by the following day.

On the 2nd postoperative day, the drains were removed and only light gauze dressings were placed on the wounds. The patient was allowed out of bed on the 3rd post-operative day.

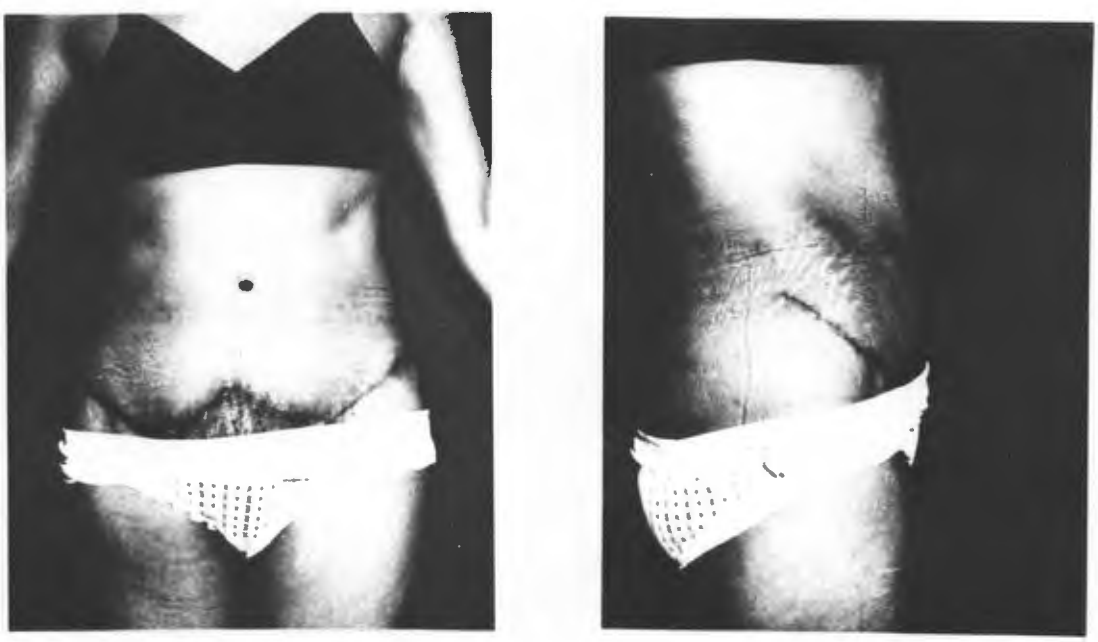
She experienced little difficulty in walking from the third day, and was soon able to walk upright.

She unfortunately developed mild superficial sepsis at the apices of the "W", but this soon settled with slight spreading of the scars at these points.

She was discharged on the ninth postoperative day.

When she was discharged one month later, for long-term followup, the wounds had healed completely and the early result was satistactory both to the patient and myself.

Preoperative.



Three Months Postoperative.

DISCUSSION:

Abdominoplasty by the "W" technique is a very satisfactory operation for correcting lax abdominal skin and a moderate degree of excess fat. This operation is not intended for the obese patient who may or may not have lost weight and requires a bulk reducing procedure or apronectomy.

In discussing abdominoplasty, I feel that it is important to distinguish between these two groups of patients, because the former generally have well-proportioned, reasonably attractive figures, marred by an excessive laxity of the abdominal wall and striae, while the latter are obese people usually of many years standing, whose problem is as much functional as aesthetic, and in whom physical relief from the burden of an apron is essentially all that can be offered.

An essential feature of aesthetic abdominoplasty is that, not only should it aim to remove the excess skin and subcutaneous tissue, but it does so leaving a scar which is hidden under the briefest of bathing suits.

Since Kelly first described his abdominoplasty in 1910, there have been a number of different operations described by such authors as Babcock, Thorek, Gonzalez-Ulloa and Castanares. These operations all use horizontal or vertical incisions or combinations of the two, and all leave scars which are not well hidden.

Not until the descriptions by Ivo Pitanguy and Paule Regnault of their operations, were proceduresavailable which fulfilled the above requirements.

As it is the Regnault operation with which I am familiar, and which has been described in this case report, I would like to discuss some features and pitfalls of this operation and the results which can be expected.

As is so often the case in the world of surgery, it is not unusual to find two surgeons with diametrically opposed views concerning a particular point in surgery and this is the case in something as simple as marking the patient preoperatively.

Paule Regnault in her article published in Plastic and Reconstructive Surgery in 1975 says:
"For better symmetry, measurements and markings are made with the patient standing"
while Grazer, in an article on Abdominoplasty in Plastic and Reconstructive Surgery in 1973 says:
"Because drawing symmetrical lines is difficult, the patient is marked while she is supine on the operating table."

While there is obviously merit in both of these conflicting statements, the choice must rest with the individual surgeon and it is our policy to mark the patient once she is asleep on the table.

Regnault states that the "W" is started in the midline within the pubic hair area, usually 1 - 3 cms. below the superior hairline. As not all surgeons seem to adhere to this advice, it is a point worth discussing. There is no doubt that when the operation is complete and the flap has been sutured to the lower incision line, there is a certain amount of pull which draws the pubic area upwards. If the incision runs along the superior hairline, this will be drawn upwards, increasing the size and height of the pubic hairbearing area, which can be unsightly. It is therefore essential that this point in the planning of the operation be adhered to.

The next point of importance is the placing of the lowest point of the "W" in the region of the inguinal ligament. As the pull here tends to draw the thigh skin upwards, it is worthwhile making this point slightly below the ligament, so that the final position of the scar will be in the region of the ligament and not too high.

The marking of the new position of the umbilicus should be done when the first sutures have been placed to fix the flaps in position. Unlike Regnault, who recommends an horizontal incision, I prefer an horizontal marquise which works well and gives a round, natural looking umbilicus.

It is important that this marquise be kept fairly small, i.e. not more than 1,5 - 2,0 cms. for two reasons. Firstly, the umbilicus will look natural and secondly, the scar which results occasionally becomes keloid, and if it is a circle of large diameter, can be very unsightly and difficult to correct by further surgery.

As this operation calls for creating a very large potential cavity it is essential to make every effort to ensure absolute haemostasis during the operation. In this regard, the point that Regnault makes about leaving a layer of areolar tissue on the deep fascia is worth stressing. This layer, not only helps to ensure that the flaps adhere, but it also is responsible for absorbing fluid exudate.

Haemostasis by means of electrocoagulation and ligatures should be carried out as the operation progresses. Large vessels, such as the veins passing up from the femoral region, and the perforating abdominal vessels should be tied in preference to being cauterized. Blood transfusion is not usually required if haemostasis during the operation is meticulous, but it ocassionally becomes necessary and should be planned for.

Certainly there is a significant loss of fluid for the large raw area created, and this should be replaced intravenously, intra - and postoperatively. The question of drainage will be discussed later.

When the flaps are trimmed, it should be noted that the pull to apply is down and medial so that lateral dog-ears can be avoided. One is normally able to excise the whole area incorporated in the original markings, but to avoid the embarassing situation of being unable to close the wounds after comitting oneself by incising along all the markings at the beginning of the operation, I have been taught and practise the method of pulling down the flaps at the appropriate stage of the operation, and marking the excision lines by measuring against the inferior wound edge.

Closure is obtained in two layers, using first heavy 0 or 2/0 Dexon as marking sutures, then 3/0 Dexon subcuticular sutures to the skin.

The question of whether to use drains or not, is once again the personal choice of the surgeon. While some surgeons feel that if the wound is dry at the end of the operation, drainage is unnecessary as small collections which may occur can easily be aspirated, I prefer to follow the authors advice and employ two corrugated drains, one on each side, exiting through the wound. These are removed after 48 - 72 hours and the wounds closed with mattress sutures inserted at the time of operation and left untied.

The wounds are reinforced with Steristrips, covered with gauze and the whole abdomen is then covered with cottonwool and strapped with Elastoplast running in an X pattern to support the wounds.

At the end of the operation, the patient is transferred directly onto her bed, with pillows under the legs to maintain the hips in a position of 120° - 100° of flexion, depending on what was required to facilitate closure. She is kept in this position for 48 hours until they are allowed up, and covered with a urinary tract antibiotic such as Bactrim.

On the third postoperative day, the patients are allowed up and about and can usually walk upright without discomfort by the fifth postoperative day.

There is an important point concerning this operation which has been mentioned only once in the literature by Grazer, and that is the question of combining this operation with intra-abdominal procedures.

Although there are some plastic surgeons who feel that this is not contra-indicated, the risk of infection must be increased and in a situation where overt sepsis could be disastrous and even life threatening to the patient because of the very large cavity created, and the added danger to the blood supply of the flaps, the risks seem to me to be unjustified where the primary operation is a purely cosmetic one, and should not be taken.

It must be remembered, however trite it may be to repeat here, that it is the patient and not the surgeon, who is taking the risk.

This operation, if performed on carefully selected and suitable patients, and carried out with care and attention to detail, can produce results which are very satisfactory to both patient and surgeon.

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RESURFACING OF NOSE.

The patient, a seventy-six year old man, was referred for surgery from the Combined Skin Tumour Clinic, run jointly in our hospital by the Departments of Radiotherapy, Dermatology and Plastic Surgery.

He had had treatment a number of times, either by the application of liquid nitrogen, or by surgery, for basal cell carcinomata and solar keratoses of the skin of the nose.

It was decided that, in view of the obvious multicentric origin of the disease, it would be best to excise the nasal skin completely and resurface the nose.

PAST MEDICAL HISTORY

1. The patient had had a prostatectomy five years previously.
2. He suffered from occasional attacks of angina pectoris for which he used sublingual T.N.T.

EXAMINATION:

The patient appeared very fit for his age.

Cardiovascular System:

Pulse: 52/min. and regular.
Blood Pressure: 160/80 mm.Hg.
Auscultation: There was a soft systolic murmur present at the apex.
There were no signs of congestive cardiac failure.

Respiratory System:

There was good air entry on both sides.
No adventitious sounds were heard.

Abdomen:

Nil abnormal was detected.

SPECIAL INVESTIGATIONS:

Chest X-Ray: Normal
Electrocardiogram: Tracing was within normal limits.
Haemoglobin: 12,5 G%.

OPERATION:

EXCISION OF NASAL SKIN AND RESURFACING OF NOSE WITH FOREHEAD FLAP.

Surgeon: Dr. L. Berkowitz.

ANAESTHETIC:

Routine endotracheal anaesthesia.

PROCEDURE:

The area to be excised was marked with Bonney's Blue. This included all the skin of the nose and extended along the ala rims and onto the tip in order to allow resurfacing of the entire cosmetic unit of the nose.

A pattern of the marked area was then made by using moist lint and this was then transferred to the forehead, marking out a forehead flap, based on the right supraorbital vessels.

POR-8 was used to decrease bleeding from the excision site and along the edges of the flap.

The skin was then excised and the flap transposed and sutured in place using 4/0 Vicryl subcutaneous sutures and 6/0 interrupted black silk sutures to close the skin.

The secondary defect was skin grafted with a graft taken from the right thigh. The graft was dressed with one layer of tulle-gras and a tie-over dressing of saline-soaked gauze swabs.

The donor site on the thigh was dressed with one layer of tulle-gras to which 5 ml. of Lidothesin local anaesthetic jelly was applied. This was then covered with one layer of Telfa dressing which was in turn covered with saline-soaked gauze swabs and a Kling bandage.

The flap was not drained. A light gauze dressing was used to collect any serous ooze from the flap.

POSTOPERATIVE COURSE:

The patient developed a small haemotoma under the base of the flap which was allowed to resolve spontaneously.

He was discharged on the second postoperative day.

On the eighth postoperative day he was seen again in the out-patient's department.

The tie-over dressing was removed and the graft was found to have taken completely.

The flap had healed well and the skin sutures were removed.

The histology report on the excised skin showed the presence of numerous basal cell carcinomas of a multicentric type as well as evidence of solar keratoses.

Six weeks later, under local anaesthesia, the dog's ear at the base of the flap was excised as a simple ellipse.

The early impression of the relined nose was that of a good colour match, as would be expected, and a slightly bulky nose.

Ten month's later, the flap had lost a lot of the swelling and it was felt that an acceptable cosmetic result had been achieved.

Operation Planned.

Ten Days Postoperative.

One Year Postoperative.

DISCUSSION:

As is well-known, skin cancer, including basal cell carcinoma, squamous carcinoma and solar keratoses, is very common in the sunny climate of South Africa and provides a large proportion of the minor, and occasionally the major surgery performed by the plastic surgeon.

Although these lesions can and do occur singly, they are frequently multiple in those patients who have a strong tendency towards getting skin cancer, particularly Caucasians with pale skins who have been exposed to excessive amounts of sunlight.

Where the lesions occur singly, they may be excised as simple ellipses. If the lesion is too big to allow a simple excision, it is sometimes necessary to resort to wide excision and reconstruction using either a local flap or a full-thickness skin graft, the former being the treatment of choice on the face.

A particular problem arises, however, as it did in this case, where there is evidence of a multicentric disease, making it very difficult to do multiple, single, excision biopsies. In an area such as the nose, which forms a complete cosmetic unit, it is considered best, under these circumstances, to remove all the affected skin as one single piece, and resurface the nose.

There are two methods available to achieve the necessary reconstruction.
A full-thickness graft may be used. In this situation, this has a number of disadvantages.
A prime consideration in the resurfacing of any area on the face is that of a colour match. A Wolfe graft taken from the postauricular or supraclavicular areas gives the best colourmatch when used on the face. As can be seen from the illustrations, however, a Wolfe graft to cover the entire nose would be too large to be taken from the postauricular area, and if taken from the supraclavicular area, would necessitate covering the secondary defect with a split-thickness skin graft, creating a secondary cosmetic defect.

The gratt would therefore, need to be taken from the abdomen giving a poor colour match.

A not insignificant disadvantage of using such a large full-thickness skin graft is its doubtful viability. Even with the greatest skill and care on the part of the surgeon, there can be no assurance of a complete take of the graft. Anything less than this would certainly lead to a cosmetically unacceptable result. In view of these points, it was felt that the method of choice was a local flap, the forehead being the obvious choice.

The forehead flap, too, has both advantages and disadvantages.
The advantages of the forehead flap include the following:
As a local flap, it provides a very good colour match.
It is an arterial flap based on the supraorbital vessels, and provided that reasonable care is excercised in raising the flap, should be assured of survival. Because of the narrow base on which this flap may be raised, one can use a large flap which is very mobile and can swing through one hundred and eighty degrees or more without endangering the blood supply.

There are two basic criticisms of the use of the forehead flap in a case such as the one I have described.
Firstly, the argument may be used that the skin one is transposing is as likely to be a site of basal cell carcinoma as the nose skin which one is excising. This is undoubtedly so, and if there is obvious clinical evidence of basal cell carcinomata on the forehead, this would rule out the use of this method as one would be achieving nothing by employing it. Even when one uses the forehead flap, the patient would have to be seen regularly to watch out for the developement of carcinoma in the transposed skin.
Secondly, the forehead skin is much thicker than nose skin and results in a large bulky nose. This is definitely a disadvantage, but one which must be considered to be outweighed by the advantages of the flap.

There is a method of achieving the desired effect and avoiding the thick forehead skin. There has been a report in the literature recently of a case where the nose was resurfaced by means of a free flap of temple skin using microvascular anastomoses. When compared with the simpler and far safer methods described above, I feel that this type of surgery is nothing less than experimental and hardly has a place in the normal clinical situation provided that the simpler methods are available to the surgeon.

There are a few points worth discussing regarding the technicalities of the operation of forehead rhinoplasty.

As is always the case in Plastic surgery, the planning of this operation is as important as the execution and should be done with great care.

It is obvious from the photographs that the area to be covered is much larger than one would think at first glance, and planning the flap with the naked eye is likely to result, in the hands of all but the most experienced Plastic Surgeon, in a flap that is too small to do the job. The simple method of transferring the pattern of the defect to be created onto moist lint and then carefully planning the flap will assure the surgeon of a large enough flap and a good night's sleep.

It is worthwhile, when raising the flap, to attempt to bevel the edges as this provides a thinner edge to suture to the remaining nasal skin, and may give a better result on the skin-grafted forehead, diminishing the effect of a punched-out defect.

Millard has described what he describes as a "gull-wing" flap which he uses for reconstructive rhinoplasty. If it is applicable in a particular case, it is a better design then the one which I used in my case, because it allows primary closure of the secondary defect.

Although I did not use a drain in this case, I feel that it is worthwhile to do so in all but the smallest of flaps, and employ a drain routinely even if only for twenty-four hours postoperatively.

The operation I have described would appear to be a rather major procedure for the pathology concerned, but the histology report, I feel, confirms the fact that it was the treatment of choice and therefore fully justified.

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PRIMARY REPAIR OF SEVERED FLEXOR TENDONS.

A fourteen month old girl was brought to the Accident Unit, Groote Schuur Hospital, a few hours after falling and cutting her right hand on some glass.

On examination she had a transverse laceration on the palm at the level of the base of the thumb. Clinically, the flexor tendons of the little and ring and possibly to the middle fingers, were severed. It was obviously not easy to assess whether or not the digital nerve had been damaged.

The child was otherwise well and arrangements were made to take her to theatre as soon as she had been starved for the required six hours.

OPERATION:

PRIMARY REPAIR OF SEVERED FLEXOR TENDONS AND DIGITAL NERVES.

Surgeon: Dr. L. Berkowitz.

Assistant Surgeon: Dr. L. Sparks (Registrar)

Incision:

The laceration was extended proximally and distally in a sinuous fashion.

Findings:

The flexor digitorum sublimis and profundus tendons, to the middle, ring and little fingers, were severed.

The flexor digitorum sublimis tendon to the index finger was severed.

The digital nerves to the second and third web spaces were severed proximal to their division.

PROCEDURE:

The wound was thoroughly cleaned and the edges of the laceration minimally debrided.

All of the damaged structures were identified and dissected free.

The sublimis tendons to the little, ring and middle fingers were excised as far proximal and distal as possible without extending the excisions too far.

The sublimis to the index finger could not be easily identified and, in view of the fact that the profundus to this finger was in tact, I decided against trying too hard to find the tendon to excise it and in doing so, cause extra adhesions.

The profundus tendons were then repaired using 5/0 Nylon criss-cross sutures to hold the tendons and a further continuous suture to coapt the edges of the tendons and prevent bulging.

The digital nerves were then repaired using 8/0 virgin silk. Magnifying loupes were, unfortunately, not available for these repairs.

The skin was closed with 5/0 interrupted sutures.

The hand was dressed with fluffed gauze, cotton wool and Kling and a dorsal slab was applied with the wrist and metacarpo-phalangeal joints flexed.

The child was admitted to the ward overnight for elevation.

She was put on Amoxil syrup 125 mg. 8 hourly for one week postoperatively.

POSTOPERATIVE COURSE:

She was seen again five days later in our hand clinic and all was well. The plaster was in tact and the position of immobilisation had been maintained.

Two weeks after the first operation, the plaster was removed and the sutures were taken out under general anaesthetic. The wounds were found to have healed primarily and a new plaster slab was applied with the hand in the same position.

Three weeks after the repair, the plaster was removed and the child allowed to begin active movements.

At 42 days postoperative, it was noted that all of the tendons were pulling through well and that the child was using the hand normally for play.

When she was last seen four months after the injury, the hand appeared quite normal and she was able to flex all of the fingers fully as far as could be determined by watching her play. It was obviously not possible to test for return of function of the digital nerves, but it is hoped that, in view of the very gratifying results that were obtained with the tendons, the nerves may have followed suit.

She will be followed up at yearly intervals to keep a check on her progress.

Injury
Note Extended Fingers At Rest.

Tendon Repair Completed.
Pointing to Divided Digital Nerves.

Four Months Later.
Full Function.

DISCUSSION:

Unlike the problem of severed flexor tendons in the so-called "no man's land" it is generally agreed by the majority of hand surgeons that tendons divided in the palm should be repaired primarily if conditions are suitable as they were in this case.

Kleinert has described the following basic principles, which, if adhered to strictly, and applied to severed flexor tendons, excluding those in the flexor sheath, should provide the surgeon with a good result.

1. Complete anaesthesia of the injured extremity.

2. A careful and thorough wound toilet.

3. Delayed primary repair or secondary repair if there is evidence of wound infection.

4. Surgery performed in an avascular field under tourniquet control.

5. Minimal surgical trauma in handling of tendon or peritendonous tissue. This implies the use of fine delicate instruments designed especially for hand surgery.

6. A technique of tendon repair that produces a firm accurate juncture with no bulging.

7. The use of small calibre non-reactive suture.

8. Prevention of tissue dessication by moistening the wound during the procedure.

9. Complete haemostasis prior to skin closure.

10. Prevention of tension on the repair site by application of a postoperative splint or cast in partial flexion for three to three-and-a- half weeks.

11. After removal of the cast, a program of graded excercises performed by the patient under his surgeon's supervision.

12. The use of dynamic splinting to minimize contractures and joint stiffness.

Those of the above which applied to our patient were carried out in treating this little girl, and I have no doubt aided us in achieving the very satisfactory result that we did.

The splinting and exercises are unnecessary in a small child and would be very difficult to achieve if one wanted to.

Kleinert writes that he advocates repairing both the sublimis and the profundus tendons for the following reasons: -

He states that tendon gliding is not a problem here, and says that the sublimis tendons are more important than they are given credit for. The sublimis except in the little finger, is a powerful muscle with more individual finger motion than the profundus. It increases the grip of the hand and makes pinch and flexion of the proximal interphalangeal joint more stable in addition to providing superior individual finger flexion.

He found that tenorraphy rupture was lessened by repairing both tendons and that adherance of the tendons to one another was not a problem.

These views are certainly not universally accepted and disagree with those of my teachers in hand surgery, who feel that the problem of tendons sticking to each other is significant and for this reason prefer to excise the sublimis tendon.

There is an important point that needs to be made concerning the surgeon who undertakes primary repair of severed flexor tendons, irrespective of where they are.

The surgery of the hand, is extremely specialised requiring a good knowledge of the anatomy of the hand. Getting to know one's way around the hand is not something one can learn out of a book and comes only with experience which should ideally be gained under the guidance of an experienced hand surgeon. In hand surgery, it is necessary to employ a very fine and careful technique in order to keep the development of adhesions down to a minimum.

For these reasons, primary repair of flexor tendons should not be undertaken by the most junior registrar, but by someone who has at least had a fairly sound grounding in the basic principles of the art.

I did not undertake the primary repair of flexor tendons until late in my training period, and then only when the most ideal circumstances prevailed, as they did in this case. My reason for being so cautious was that in working with experienced hand surgeons, it did not take long to appreciate that good results are not easy to achieve in this field if one does not have the experience and adequate backup services such as good physiotherapists and occupational therapists.

In tackling this case, I had ideal theatre conditions, the patient was well suited to the procedure because of the short interval prior to surgery, and I was fortunate to have the assistance of another registrar experienced in hand surgery.

One must not lose sight of the fact that this sort of early result is not necessarily the rule when one is still young and relatively inexperienced, but it was nevertheless an extremely gratifying case.

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FLEXOR TENDON GRAFT.

HISTORY:

This unfortunate sixty year old lady was the victim of an assault.

Her assailant, prior to raping her, had threatened her with a knife and, in the ensuing struggle, she had grabbed the knife with her right hand and had sustained the following injuries.

There were superficial lacerations on the flexor surfaces of the proximal phalanx of the thumb and distal phalanges of index and middle fingers.

There were also lacerations on the flexor surfaces of the proximal phalanges of ring and little fingers and clinically both the flexor digitorum sublimis and profundus tendons to these two fingers were severed.

In accordance with the policy of our Hand Clinic, when conditions were not ideal for primary repair, the skin wounds were cleaned and closed primarily, the plan being to perform flexor tendon grafts once the wounds were healed and satisfactory passive movements were present.

Only light dressings were used and the patient was referred to the Occupational Therapy and Physiotherapy departments for active and passive exercises starting on the day after the injury.

Over the next six weeks the patient was seen at regular intervals and once the wounds were healed and the passive movements were full, surgery was arranged.

OPERATION:

FLEXOR TENDON GRAFTS TO RIGHT RING AND LITTLE FINGERS.

Surgeon: Dr. L. Berkowitz.
Assistant Surgeon: Mr. Martin Singer (Consultant).

PROCEDURE:

Incisions:

LITTLE - a midlateral incision continued proximally onto the palm.
RING - Bruner incisions were used on the ring finger. They were not continued proximally to join up with the palm incision.

Procedure:

A tourniquet was used on the right side for one hour and thirty-four minutes initially and then for a further sixty minutes. On the left side, the tourniquet was used for fifteen minutes while removing the palmaris longus tendon.

The neurovascular bundles were identified, found to be intact, and preserved.

The flexor sheaths were now exposed.

Pulleys were created from flexor sheath over the metacarpal head, and over the base of the proximal phalanges and the middle of the middle phalanges.

The sublimis tendons were excised as were the profundus tendons, leaving a 1,5 cm. stump of profundus distally. These stumps were then freed from their attachments to the proximal half of the terminal phalanges.

Both palmaris longus tendons were then taken via multiple transverse incisions.

The grafts were then sutured in place using 4/0 black silk sutures, making use of a modified Harrison technique distally and the Pulvertaft technique proximally.

At the end of this procedure, it was felt that the fingers were in a good position and that the tension on the grafts was optimal.

The skin was then closed with 5/0 interrupted nylon sutures and dressed with fluffed gauze, cotton wool, Kling bandage, and a Plaster of Paris sandwich with the wrist and metacarpo-phalangeal joints flexed approximately thirty and forty-five degrees respectively.

Once the patient had recovered from the general anaesthetic, she was given a collar and cuff and analgesics and allowed to be taken home.

One week later her wounds appeared to be healing well.

Two weeks postoperatively, under general anaesthetic, the dressings were removed. The wounds were found to have healed primarily, the sutures were removed, and a dorsal slab was applied.

Three weeks postoperatively the dressings were removed once again.

It was noted that there was definitely some flexion of the terminal interphalangeal joints and she was allowed to remain free and to begin gentle active movements.

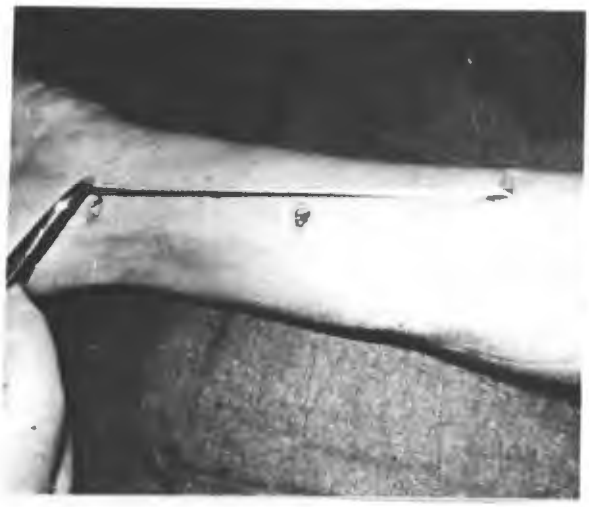
At the present time she is having active physiotherapy and is slowly gaining flexion.

Preoperative. At Rest.

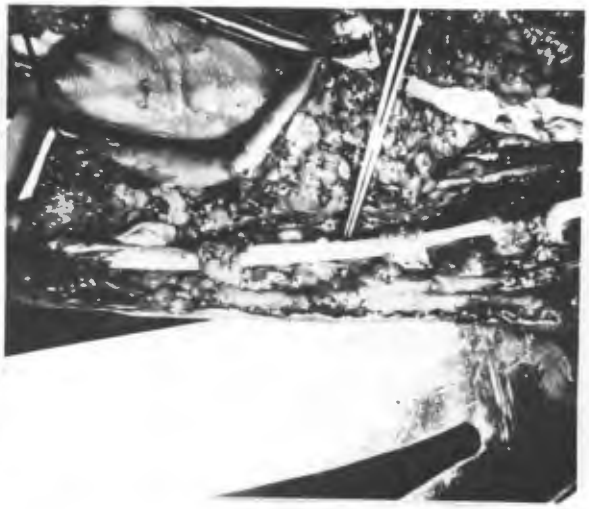
Preoperative.
Flexing Fingers.

Incisions Planned.

Note Instruments
Under Pulleys.



Palmaris Graft.



Graft in Position.

Proximal Junction.

Operation Completed.

Postoperative Immobilisation.

Three Weeks Postoperative.
Starting to Pull Through.

DISCUSSION:

I have been very fortunate, during my training, to have been attached to an organised hand unit, where I and my fellow registrars have had the opportunity of learning the basic principles of hand surgery under the supervision of experienced hand surgeons.

The accent has been on conservatism and care in approaching hand problems.

Once one has been exposed to hand surgery in the correct environment, it becomes very obvious that this is a very specialised branch of surgery that should only be undertaken by surgeons with the interest and training in this field, if one is to achieve better than second rate results. In order to go about trying to achieve good results, there are certain basic principles that should be followed.

Hand surgery should always be undertaken, where possible, with the best facilities available. One should work in a clean, well equipped, well lighted theatre. It is virtually essential to use a tourniquet if one is to see what one is doing. Although not essential, it is preferable to have an assistant; if possible one who is acquainted with hand surgery.

The hand is a very delicate structure and in performing hand surgery, it is essential to use the most careful and delicate technique in order to avoid causing any further damage and thereby leading to excessive fibrosis. When doing fine work, such as digital nerve repair, it is preferable to make use of magnification, using either a loupe or an operating microscope.

The question of flexor tendon repair has been the subject of much controversy for many years and will be familiar to any surgeon who does this work.

Bunnell, years ago, decreed that the area between the distal palmar crease and the insertion of the sublimis tendon was a "no mans land" and that the treatment of choice for severed flexor tendons in this area was a delayed tendon graft.

This teaching was accepted and taught for many years and is still a commonly held belief.

However, as early as 1960, Verdan reported on a short but encouraging series of cases of primary repair of severed flexor tendons. In 1967 Kleinert et al reported on a ten year series of primary repairs and came to the conclusion that"No man's land" was indeed "some man's land. There were, of course, certain conditions which had to be fulfilled before this could be so.

Firstly, it was pointed out that only an experienced hand surgeon should even consider undertaking such an operation. In fact, Verdan, in proposing primary repair as a treatment of choice in severed flexor tendons, said that a surgeon who was capable of performing a flexor tendon graft was capable of doing a primary repair.

Secondly, the local conditions are very important.

In order to be considered for primary repair, the wound has to be a clean, incised wound made by a sharp instrument, with minimal tissue damage, no contamination and no open fractures. Closed fractures and lacerated neurovascular bundles are not a contraindication and are repaired at the same time.

The figures claimed by Kleinert and his colleagues in 1967 were so good i.e. 86% good results with primary repair of flexor tendons, that they were obviously held in grave doubt by some of the leading hand surgeons present at the symposium at which these figures were first presented.

However, what is of importance is the fact that the principle was established, by senior figures in the world of hand surgery, that primary repair of severed flexor tendons is a good operation which gives good results, provided that it is undertaken by an experienced hand surgeon with good facilities at his disposal.

These principles are essentially those that are taught in our hand unit.

As conditions were not ideal for a primary repair to be attempted in this patient, the skin was closed by the registrar on duty and the patient was referred to the very next Hand Clinic.

She started having physiotherapy and occupational therapy as soon as the initial pain had subsided, and this continued until her wounds had healed and her passive finger movements were back to normal. Once this had been achieved, she was ready for reconstructive surgery.

A few points regarding the technique used in the flexor tendon graft are worth discussing.

1. Timing of the operation:

It is the practice in our hand clinic to perform delayed secondary flexor tendon grafts. Although Harrison prefers delayed primary grafting and claimed very good results for the procedure in a report published in 1969, most surgeons still prefer, as do my teachers, to wait for complete healing of the wounds, softening of the scars and a return of passive movements to normal or as near normal as can be achieved with active physiotherapy and occupational therapy.

2. Exposure:

The type of incision used is up to the individual surgeon and may be dictated to a certain extent by the nature of the original wounds.

The most commonly used in our clinic are the midlateral and the Bruner incisions. The Bruner incisions give very good exposure, but have the disadvantage of crossing the neurovascular bundle a number of times and call for extreme care in avoiding these structures.

It is essential in this operation to have adequate exposure as scratching around looking for structures through a small incision can only result in additional adhesion formation.

The incision should be carried to the middle of the distal pulp and proximally it is necessary to expose the lumbrical origins and sometimes even to extend the incision as far proximal as the carpal tunnel.

3. Pulleys:

Once the fibrous flexor sheath has been exposed, the tendons are removed from the sheath via incisions which are so placed as to leave intact a number of pulleys, if there is sufficient good quality tissue left.

Often it has been badly damaged in the original injury and must be removed.

The pulleys are made at the level of the head of the metacarpal, at the base of the proximal phalanx and in the middle of the middle phalanx. If there is no sheath left with which to construct pulleys, they are made from tendon graft.

4. Graft Attachment:

This is obviously a very important point as disruption, particularly at the distal insertion, is not infrequently the cause for a failure.

The technique favoured by my teachers is as I have described in the case report.

Distally, the graft is passed through the stump of the profundus which has previously been lifted slightly from its attachment to the distal phalanx. The two tendons are then sutured together with a number of sutures and the end of the profundus is wrapped around the graft.

The tension is now corrected and the proximal end of the graft attached by means of the Pulvertaft technique, threading the graft through the profundus tendon a number of times, the two tendons being sutured together at each point where they cross.

5. Closure:

Prior to closing the skin, the tourniquet should be released and adequate haemostasis should be obtained.

Closure of the skin should be with a number of fine sutures.

6. Immobilisation:

The wrist is flexed approximately 30 degrees and the metacarpo-phalangeal joints are flexed approximately 45 degrees.

The wounds are dressed with fluffed gauze, Velband or cotton wool and Kling bandage and the arm is then immobilised by means of a Plaster of Paris sandwich.

The immobilisation is kept on for two weeks after which it is removed under a general anaesthetic and the sutures removed. The arm is again placed in a Plaster sandwich for a further week after which the patient is allowed to being active movements. Sometimes the surgeon may choose to keep the patient immobilised for four weeks.

COMPLICATIONS OF FLEXOR TENDON GRAFTS:

Despite the fact that this is an operation that is widely performed and often by very experienced hand surgeons, the results are not good.

This is understandable when one considers that the operation is not physiological.

Finger flexion normally requires two tendons gliding in a close-fitting fibrous sheath and lined by synovial membrane.

The injury destroys the function of the sheath and only one tendon is reconstructed. One should therefore not expect to achieve a good result all of the time.

The most common causes of failure are the following:

1. Interference with gliding by the formation of adhesions. These form as a part of the healing process of the graft.

2. Breakdown of the suture line. This most commonly occurs distally and is due to the graft not making adequate contact with the periosteum of the distal phalanx and therefore not forming a solid union with it.

3. Inappropriate tension on the graft. This results from bad judgement during the operation or a failure to maintain the correct tension while the graft is being sutured in place.

4. "Bowstring effect". If pulleys are not constructed, the tendon, on flexing, may dislocate forward. If this happens, the tendon may still weakly flex the finger but its action will not be very strong.

5. Swan-neck deformity. Normally the middle phalanx is flexed before the distal phalanx by the action of the sublimis. If this tendon is destroyed and only the profundus is reconstructed, a swan-neck deformity may result. The balance between the flexor and extensor apparatuses is upset, the proximal interphalangeal joint becomes hyperextended, and the distal joint is flexed. The swan-neck deformity is especially apt to occur if laxity at the level of the proximal interphalangeal joint permits hyperextension. To prevent this happening, one should preserve the bands of the distal insertion near the joint and free them only if adhesions prevent correction of a marked constriction of the proximal interphalangeal joint. The treatment of the swan-neck deformity, therefore, consists of preventing hyperextension of the proximal interphalangeal joint.

The Littler procedure, which uses one of the lateral bands of the extensor apparatus cut at the base of the finger and rerouted anteriorly to the Cleland ligaments to be sutured to the fibrous sheath, while maintaining the proximal interphalangeal joint in slight flexion, appears to be a good method for correction of this deformity.

A significant advance in the treatment of severely damaged fingers has been the introduction of the Silastic rod. This technique makes use of the fact that, if one implants a piece of Silastic in the tissues of the finger, and attaches it to the tip of the finger so that it slides freely in passive finger flexion, a new smooth sheath forms around it which provides a gliding surface for a subsequent flexor tendon graft.

In our hand clinic this technique is used essentially for severely damaged fingers in which there has been a lot of fibrosis due to the original injury or failed previous repair or tendon graft.

Although the follow-up in my patient is not very long, she has started to pull through well and is still receiving regular occupational and physio- therapy.

She will be followed up at regular intervals to assess her progress.

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HYPOSPADIAS.

The patient, a ten year old Malay boy, was brought to our outpatient department by his parents who requested that we correct his hypospadias and at the same time perform a circumcision for religious purposes.

HISTORY

The boy had been born at full-term by normal vaginal delivery following a normal pregnancy. There was no family history of hypospadias. He had had an associated cardiac anomaly, an atrial septal defect, which was corrected surgically at the age of five years. Following this operation he had been quite well and developed normally.

EXAMINATION

The patient was a healthy child who appeared to be somewhat mentally retarded and was very anxious during the physical examination.

Cardiovascular System:

Pulse: 120/mins. and regular.

Blood Pressure: 110/60mmHg.

Auscultation: There was a soft systolic murmur present. There were no signs of congestive cardiac failure.

Respiratory System:

Good air entry was present and no adventitious sounds were heard.

Abdomen:

Nil abnormal detected.

LOCAL EXAMINATION

The right testis was an emergent inguinal incompletely descended testis. A distal third penile hypospadias was noted. The meatus was adequate in size and situated 4mm. from the corona. There was no chordee.

SPECIAL INVESTIGATIONS

Haemoglobin: 11.5 G%

Chest X-Ray: Normal

Intravenous Pyelogram: Revealed the upper and lower urinary tract to be normal.

OPERATION

ONE-STAGE REPAIR OF HYPOSPADIAS.

Surgeon: Dr. L. Berkowitz

PROCEDURE:

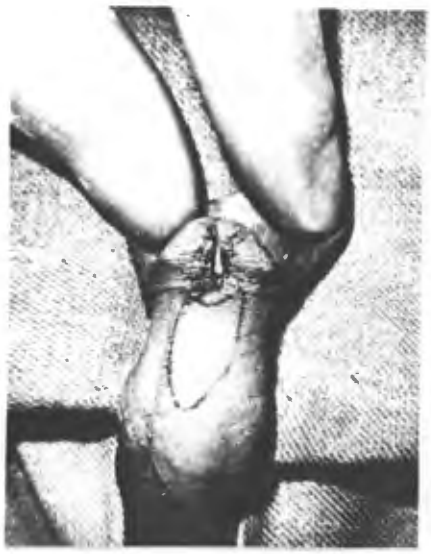
The Horton-Devine one-stage operation for the repair of distal hypospadias was performed. POR-8 was used to aid haemostasis. A triangular flap based on the existing meatus and approximately 2cm. long was raised. An incision was then made from the meatus running along the midline of the shaft to the corona and carried around the coronal groove. Three glandar flaps, a central triangular flap and two lateral flaps were then raised. The central flap was advanced so that its apex could be sutured into the slit in the distal edge of the meatus, thereby preventing contraction and stenosis. The penile flap was then tubed and sutured to the midline glandar flap bringing the new meatus out on the tip of the glans. The new urethra was covered distally by overlapping the lateral glandar flaps over it.

The prepuce was then unfolded, button-holed, and brought over as an Ombredanne hood to supply full-thickness cover to the new urethra. An 8F. G. guage sterile feeding catheter was used for urinary drainage and sutured to the glans. The penis was dressed with a layer of tulle-gras, cotton gauze and elastoplast.

Postoperative course:

This was uneventful. The child was apyrexial apart from a slight spike of temperature on the first postoperative day. He was placed on bactrim as a urinary antiseptic. The dressings and catheter were removed on the sixth postoperative day to reveal a minimally swollen penis with healing wounds. The child was able to pass urine spontaneously soon afterwards and he had a good stream with no evidence of a fistula. Because of the excess bulk of prepuce, the penis did have a slightly hooded "cobra" appearance, but it was felt that this would settle down in time and could always be revised as a minor procedure if necessary.

When last seen, one month postoperatively, the penis had a relatively normal appearance and was functioning well with no evidence of fistula formation.



Preoperative Markings.

Flaps Raised.

Flaps Sutured.

One Month Postoperative.

DISCUSSION

One soon discovers on reading through the literature on hypospadias that this is truly one of the conditions for which the perfect, or almost perfect operation, has still not been found. Although over 150 authors are credited with describing techniques for hypospadias repair only a handful of these operations appear to enjoy popularity today. The operation originally described by Denis Browne (1949) has been and remains a popular procedure. Louis Byars' two-stage operation is another which appears to give good results in the hands of surgeons of varying degrees of skill and the modification of this procedure described by Durham Smith in 1973 appears to me to be probably the best two-stage procedure available today with its advantages of using abundant prepuce to create a new urethra, bringing the new meatus out on the tip of the glans, and achieving a double-breasted, off-set two-layer closure over the new urethra.

Since the late fifties, descriptions have appeared in the literature of one-stage operations for correction of hypospadias. Among the best-known of these are Mustardé's operation for distal hypospadias, Broadbent and Woolf's operation for proximal hypospadias and the operation of Horton and Devine which may be used for any form of hypospadias.

The obvious advantage of a one-stage operation has to be carefully weighed against the disadvantages. These operations, particularly the Horton-Devine operation for proximal hypospadias which makes use of a free full-thickness skin graft, carry with them a tremendous responsibility for the surgeon, who has to take every care to ensure that primary healing and success will be achieved. This is obviously always the aim in surgery but in repairing a hypospadias with a one-stage operation, one embarks on a course from which it is extremely difficult to extricate oneself if things go wrong. The free graft operation particularly, is an all or none phenomenon and one stands to lose a lot if it fails. A point stressed very strongly by Horton and Devine is the need to be absolutely sure that the chordee is completely corrected as recurrence of chordee following the one-stage urethroplasty is extremely difficult to correct.

These authors in their original description had a high fistula rate of approximately 30%, but in their hands have probably decreased this figure considerably.

At this point it is worth stressing something which I feel is of considerable importance in hypospadias surgery. Louis Byars, in an article on hypospadias repair, made a point which appears to be self-evident but which I feel is important enough to stress over and over again to the potential repairer of this congenital anomaly. He said "regardless of the method followed, successful hypospadias repair requires the meticulous execution of minute details of technique." Although my personal experience of the surgery of hypospadias correction is limited, the truth of this statement has become very apparent to me, and I believe that ideally hypospadias repair should only be undertaken by surgeons with the interest and time to devote to meticulous surgery, and not by someone with a passing interest in the odd case.

The case I have described presented two problems on deciding on management.

The first was the question of whether surgery should be undertaken at all in such a minor case of hypospadias. There are surgeons who believe that if the child is functioning well, no surgery should be performed.

However, it may be argued, that every man should have the right to have a penis which looks normal and functions normally. Also if the minimal degree of hypospadias is associated with chordee, the correction of the chordee will create a penile hypospadias which would require correction.

Mustardé in 1965, wrote that the sub-coronal or glandular forms made up more than 90% in his series and that approx. 60% of these had a definite degree of chordee.

On these grounds, I feel that if the parents of such a child, request surgical correction, this should be undertaken, after great care has been taken to inform them of the possibility of complications and the need in this event for more than one operation.

The second problem was the choice of operation.

For this form of hypospadias, I feel that the Horton-Devine operation , or the Mustardé operation which is virtually identical, is ideally suited and gives a very satisfactory result particularly in view of the fact that the glans is converted from the spatulate shape of the hypospadic penis, to the normal conical shape and that the meatus is brought out on the tip of the penis.

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SYNDACTYLY.

A Coloured male aged nine months, presented with simple Syndactyly involving the ring and middle fingers of both hands, and the second and third toes of the right foot.

There was a positive family history for the condition and the patient's eldest sister has polydactyly presenting as conjoined fifth and sixth digits on the left foot.

EXAMINATION:

The child was healthy and fit for surgery. Examination of all systems revealed nil of note.

LOCAL EXAMINATION:

Simple syndactyly consisting of webbing extending to halfway down the distal phalanges was present with no synostosis. There were no interposed phalanges present.

OPERATION:

Surgeon: Dr. L. Berkowitz.

RELEASE OF SYNDACTYLY BETWEEN LEFT, MIDDLE AND RING FINGERS.

PROCEDURE:

The flaps were designed as follows:
A large dorsal rectangular flap was designed based at the level of the metacarpal heads and continuing distally and becoming narrower towards the end of the flap, which reached to just proximal to the level of the proximal interphalangeal joints.

Z-Flaps were then designed on the dorsal and palmar surfaces of the web in order to assure full-thickness cover on the radial side of the ring finger.

A tourniquet was used while separating the fingers and completing the dissection, after which it was released and haemostasis obtained.

During the dissection, extreme care was taken to identify and preserve intact the neurovascular bundles.

On the palmar surface the skin was split proximally to the level of the distal palmar crease, and then "fish-tailed" i.e. from the apex of this cut two further short incisions at right angles to one another were made in order to increase the separation and give a wider inset to the dorsal flaps.

Having completed the dissection, the flaps were sutured in place with interrupted 5/0 nylon and the skin defects of the ulnar border of the middle finger and at the base of the ring finger were skin-grafted with a thick split-thickness graft from the left thigh.

The hand was dressed with one layer of tulle-gras, cotton wool soaked in Acriflavine, fluffed gauze, Kling bandage and an above elbow plaster cast.

POSTOPERATIVE COURSE:

This was uneventful.
On the ninth postoperative day the dressings and sutures were removed under general anaesthetic. Apart from some epidermal skin loss, the skin grafts had taken well, the flaps were all healthy and a good early result was felt to have been achieved.

In view of the satisfactory course following this operation, it was decided to carry on and repair the right hand during the same admission.

OPERATION:

Surgeon: Dr. L. Berkowitz.

RELEASE OF SYNDACTYLY BETWEEN RIGHT RING AND MIDDLE FINGERS.

PROCEDURE:

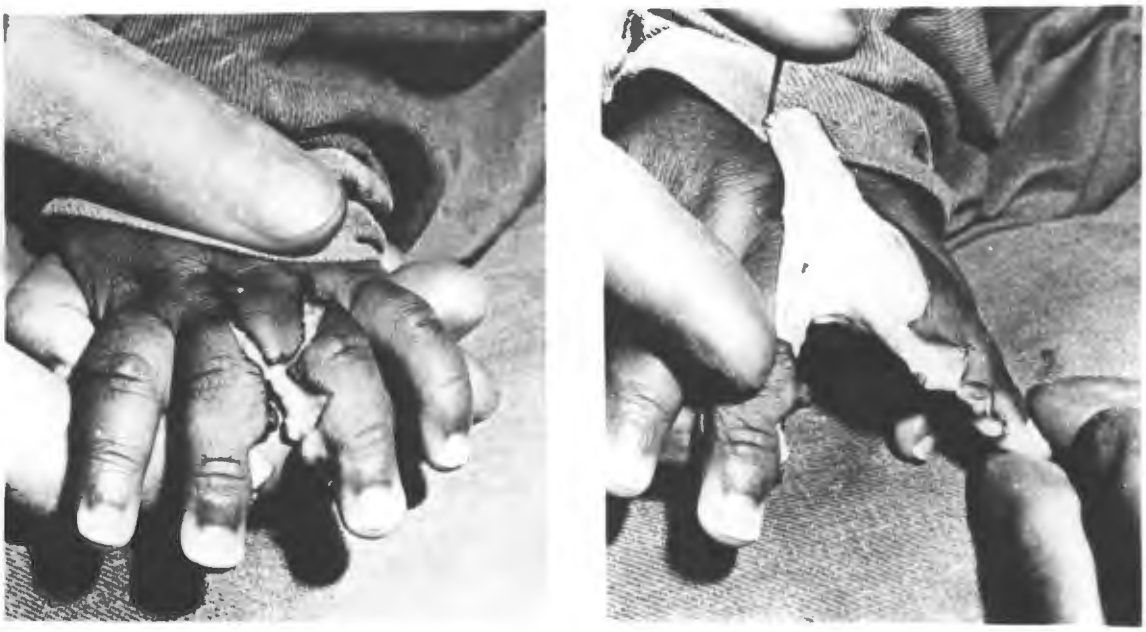
The technique as described above was used. In this case there was sufficient skin present to allow full-thickness cover to be achieved on both fingers in the distal two-thirds, and only small areas at the bases of the fingers required grafting with a thick split-thickness skin graft.

POST OPERATIVE COURSE:

The child did well and there was complete take of the skin-grafts at primary healing. Following his discharge it was arranged that he be followed up in our Hand Clinic at regular intervals.

Preoperative.

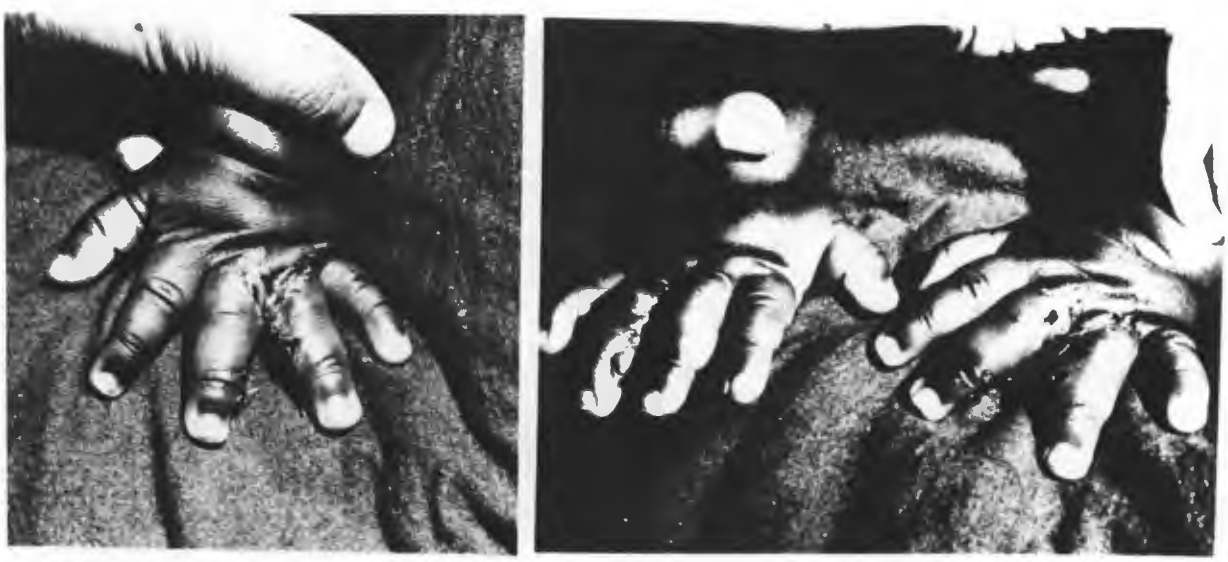
Preoperative Markings.



Fingers Divided and Flaps Raised.

Flaps Inset. Prior to Skin Grafting.

After Skin Grafting.



Postoperative Result.

DISCUSSION:

After polydactyly, syndactyly is the most common congenital anomaly of the hand.

It occurs in approximately one out of every two thousand live births and is far more common in males then in females.

In just over a quarter of the cases, there is a family history and the inheritance is both Mendelian dominant and sex-linked. Both hands are affected in over one-third of cases and the web most commonly affected is that between the ring and middle fingers. When associated with syndactyly of the toes, it usually is the second and third toes which are involved, as was demonstrated in the case described.

Almost forty percent of cases of syndactylism are associated with other anomalies of the hand such as polydactyly, brachydactyly, lobster claw hand and not infrequently with complicated anomalies of phalanges and metacarpals such as synostosis. The most extreme case of syndactylism occurs when all the fingers are involved, resulting in the so-called "mitten hand".

In view of the relatively common incidence ot this condition, it is one of those congenital anomalies with which the Plastic Surgeon should be completely au fait, and the treatment of which should present no special problems.

It is interesting to note that, unlike the subject of Hypospadias and its repair, syndactylism has been the subject of relatively few articles in the literature and one must therefore, surmise that the results of surgery are on the whole satisfactory and have not prompted the development of a host of different surgical techniques to effect the repair of this condition.

The goal in syndactyly repair is:

1. To produce a commisure between the fingers which looks normal, is simple and will not be subject to recurrent adduction contracture (or "creep" as it is described in common surgical parlance.)

2. To cover the adjacent sides of the involved fingers with supple skin which does not limit their movement or give rise to contractures.

3. To provide a cosmetically acceptable result.

Prior to discussing the surgical techniques, one should mention the question of age at operation.

Barsky waits until the child is two years old, and in their article on syndactylism repair, Kettelkamp and Flatt conclude that the most important factor influencing the result of the repair is the age of the patient, and they feel that it is unwise to operate prior to eighteen months of age. Neither of these authors go into detail as to why they arrive at their individual age limits, but I feel that the only significant factor is the size of the structure and the difficulties involved in avoiding damage to particularly the neurovascular bundles.

The case that I have described was not selected by me, but presented to me on an operating list on my first day in a new post. I was extremely careful to preserve all vital structures and fortunately obtained an acceptable result with no surgical complications. There is no doubt in my mind that the safety factor would have been much increased by the use of a loupe for magnification and I feel that to an ever-increasing extent, this should become standard practice in hand surgery, certainly in children.

I am not advocating surgery for syndactyly at this age, but feel that magnification and care would minimize the surgical difficulties. The effect on growth of early repair of uncomplicated syndactyly is not known as yet.

As regards the techniques of repair, there are three main groups of operations:

1. Those which utilize the available skin to form the commisure and cover the fingers.
2. Those which utilize skin grafts, either split- or full-thickness.
3. A combination of one and two above.

THE COMMISURE:

Cronin in the forties, and Skoog in 1965 recommended the use of two triangular flaps, one dorsal and one palmar which resulted in a good, functional commisure which closely resembled the normal.

Barsky uses a single, palmar, triangular flap to form the commisure.

Bainer, Tondra and Trusler use a dorsal rectangular flap based on the middle finger used to cover the proximal portion of the finger.

It would appear from the literature that the results of all of these techniques are essentially similar, giving satisfactory primary results in 75% - 100% of cases.

CLOSURE AT THE SIDES OF THE FINGERS:

A number of different techniques are described:

1. Z-Plasty or zigzag incisions and skin graft.
2. Straight incision and skin graft.
3. Straight incisions and primary closure.
4. Curved incisions and grafts.

Kettelkamp and Flatt found that all of these techniques gave much the same results.

The technique which I have employed in my case does not, therefore, depart from the principles described and has the following advantages.

The dorsal rectangular flap produces a good commisure. I feel that two points of technique employed are very important in producing a satisfactory and long-lasting result. The palmar incision should be carried well proximal i.e. a certain amount of overcorrection should be achieved and "fish-tailing" the proximal end of this incision gives a wide inset to the flap.

It is important to try and surface the radial side of one of the involved fingers with skin flaps in order to ensure good resection where it is most needed, and this is achieved by careful planning of Z-flaps.

Occasionally, as was the case with the right hand in this child, one can obtain full-thickness cover on two-thirds of both fingers.

The impression from the literature is that either thick split-thickness or full-thickness grafts will do for the resurfacing, although Skoog specified that he uses full-thickness grafts and only uses split-thickness grafts in extreme defects. While one can obtain satisfactory results using thick split-thickness grafts as was the case in the child described, I have had the unfortunate experience of late contracture developing in another child, following the same procedure, and now feel that full-thickness skin grafts are the treatment of choice.

A further point in management which is the topic of much discussion and much surgeon variation, is the length of immobilisation prior to the first dressing changes. While some surgeons prefer to examine the hand fairly soon after surgery, others are content to leave things undisturbed for up to three weeks. I feel that the presence of infection or loss of skin-graft is not always detectable from the child's general condition and examination of the hand in plaster, and therefore prefer to do the first dressing change under general anaesthetic, seven to ten days postoperative.

In concluding this discussion, I would like to quote Tord Skoog, who has stated that "though the operative treatment of syndactyly is simple in conception, it requires meticulous attention to detail in planning and execution in order to obtain a good result".

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