

SURGERY OF THE HALLUX VALGUS

by

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We will present today a simple operation for the Hallux Valgus, We have used this technique and found it very satisfactory.

We should begin this presentation with a few words about the ETIOLOGY of the Hallux Valgus.

As you know the SHOE is always accused, but the shoe alone is not sufficient to produce bunions, in fact not all feet subjected to the same type of shoes will develop the deformity.

A PREDISPOSITION is necessary, and such predisposition is made up of two essential factors:

1. THE CONGENITAL METATARSUS VARUS.
2. THE DIFFERENCE IN VARIATIONS IN THE COMPARATIVE LENGTH OF THE TOES.

As for the METATARSUS VARUS, Morton, in 1935, in a study of Comparative Anatomy described the pre-historic foot.

SLIDE-1

Here the Man of Neanderthal has a prehensile foot resembling the hand. The Metatarsals are displayed, the first Metatarsus is varus. The great toe is deviated inward and is clearly separated from the others, resembling a thumb.

This disposition is found normally in the fetus nine weeks old, and in a minor degree, in a great number of adults.

Now, early Man walked on bare feet but trouble began when his descendants, more refined, protected their feet with shoes. These shoes were often ill fitted and too tight.

The shoes, especially if too narrow, have a double deforming action on the foot:

1. They produce a non-use atrophy of the muscles of the feet and leave the foot deprived of corrective forces.

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SLIDE-2

The great toe is pressed against the tip of the shoe, receives a backward pressure, and is pushed into valgus. The pressure is transmitted to the first metatarsal head which angulates inward and increases the Metatarsus Varus.

As soon as the osseus deviation is started, the trajectory of the tendons is modified and their abnormal pull increases the deformity.

The EXTENSOR PROPRIUS HALLUCIS acts as the cord of an arch; it retracts, and fixes and increases the deformity.

The LONG FLEXOR acts in the same manner and LUXATES THE SESAMOIDS WHICH BECOME ADHERENT TO THE METATARSAL HEAD and OPPOSE THE REDUCTION OF THE METATARSUS VARUS.

The ADDUCTOR HALLUCIS (not shown in the picture) also pulls outward, and is no longer opposed by the action of the ABDUCTOR which has now slipped onto the plantar surface of the metatarsal following the rotation of the toe.

The first Phalanx subluxates toward the lateral side of the metatarsal head. The medial side of the head enlarges, and a BURSITIS and a painful EXOSTOSIS develops.

The INTERNAL COLLATERAL NERVE overlies the bursa and exostosis and becomes extremely sensitive.

SLIDE-3

The DIFFERENCES IN THE COMPARATIVE LENGTH OF THE TOES also play an important part^a as predisposing factor:

There are 431 possible combinations, but for practical purposes they can be reduced to those six shown here. A CANADIAN STATISTIC based on 7000 observations give the following percentages:

40% presented the great toe shorter than the second.
GREEK FOOT $2 > 1 > 3 > 4 > 5$
STANDARD FOOT $2 > 3 > 1 > 4 > 5$

37% presented the great toe longer than the second.
EGYPTIAN FOOT $1 > 2 > 3 > 4 > 5$
Hallomegaly $1 > 2 > 3 > 4 > 5$

22% presented the Great Toe equal to the second.
SQUARE FOOT $1 = 2 = 3 = 4 > 5$
Equality First 2 Toes
 $1 = 2 > 3 > 4 > 5$

1% all other combinations.

The black area here represents the shoe. It is clear that the most predisposed feet are those of the EGYPTIAN and SQUARE type. The GREEK foot remains as the ideal type of foot, and the surgical treatment for Hallux Valgus should attempt to reproduce this type of foot.

SLIDE-4

The RADIOGRAPHS show:

- 1. The Deviation of the Phalanx.**
- 2. The Metatarsus Varus,**
- 3. The Lateral luxation of the Sesamoids,**
- 4. The Exostosis which are usually more important than they appear on the film.**

The X-rays, naturally give no account of the fibrous and tendinous retractions.

The MEDICAL TREATMENT of the Hallux Valgus has some action only in initial cases, but it is generally ineffectual.

The SURGICAL TREATMENT is the only effective treatment for any fixed and painful deformity.

There are about One Hundred different techniques described in the Literature and I have tried to group the most common of them for a brief review.

1. SIMPLE RESECTION OF THE BURSA AND EXOSTOSIS (Schede No. 1-Silver Techniques). This procedure is a useless action because the deviation persists and the bursitis will develop again.

2. OSTEOTOMY OF THE FIRST METATARSAL SHAFT (Loison, Juvara No. 1, Ludloff, Balacescu, Lapidus techniques, and so on.) These operations reduce the metatarsus varus, but the great toe will remain deviated. A long immobilization in a cast is also required.

3. OSTEOMOTY OF THE FIRST METATARSAL NECK (Reverdin, Ombredanne, Hohman, Lance & Brazy techniques). These operations correct the deviation of the toe but do not correct the Metatarsus Varus and require long immobilization.

4. ARTHRODESIS OF THE FIRST METATARSO-PHALANGEAL JOINT, (McBride, McKeever techniques). This operation abolishes the dorsal flexion of the first phalanx, which is essential for the unrolling of the foot during ambulation. The metatarsal lever becomes too long, and the operation requires a long immobilization. A callosity often develops under the interphalangeal joint.

5. RESECTION OF THE FIRST METATARSAL HEAD (Duplay, Hueter, Mayo). These operations have been among the most practiced. Some patients feel relieved for some months, but rapidly begin to suffer, at times more than before, because of Osteoarthritis of the metatarso-phalangeal joint. The essential anterior support of the foot is removed and this creates a difficult problem for a further procedure.

6. OPERATIONS ON TENDONS AND FASCIAE ENCIRCLING THE METATARSAL HEAD, (Krida, Hohman, Barraga, Joplin, Camera). These are too long and at times too complicated procedures. Preserved tendons of Renne or Kangorow, fascia lata, (Hohman) tendon of the lesser plantar (Barraga), tendon of the extensor of the fifth toe (Joplin) have been used. These tendons are well tolerated at the beginning, but too often they liquify in 5 to 18 months and must be removed.

Linen, Nylon or wire also are not well tolerated.

7. RESECTION OF THE PHALANGEAL BASE, (Keller, Brandes or Schanz techniques). These operations are preferred at present by most surgeons for severe deformities.

Dr. Lelievre, modified the Keller operation and added to it a really simple procedure for the correction of the Metatarsus Varus.

A Straight incision is made along the medial aspect of the metatarso-phalangeal joint.

The capsular ligament and periosteum are incised and retracted exposing the articular surfaces.

The base of the phalanx is disarticulated, and with a saw or osteotome the proximal part of the phalanx is removed. The amount to be removed should be just enough to make the great toe five millimeters shorter than the second toe as it is the Greek foot shown before. Lelievre found that the resection of the posterior one-half or two-thirds of the phalanx, as recommended by Keller, is a little too excessive. The great toe becomes too short and is exposed to painful torsion.

The exostosis and osteophytes are then removed with a sharp osteotome in a manner to preserve the weight bearing surface of the metatarsal head. This osteotomy should not remove too much of the head of the metatarsal.

When the retraction of the extensor proprius Hallucis is very little, a tenotomy in its own sheath would be sufficient to avoid the impinging of the phalanx upon the metatarsal head. If the retraction is too severe, then a lengthening of the tendon should be carried out.

This is rarely needed
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The resected end of the phalanx and metacarpal head should separate 5 to 6 millimeters from each other when the end of the toe is pulled upon.

SLIDE-5

Now the obstacle to the reduction of the metatarsus varus is represented only by the lateral luxation of the two Sesamoids, of which the internal one adheres to the plantar face of the first metatarsal head. The sesamoids must be freed from the metatarsal head.

The cleavage plane is obtained by use of the periosteum elevator, and dissection is carried as far as the lateral surface of the second metatarsal head.

As soon as this dissection is completed, there are no problems in reducing the metatarsus varus, and we have found the metatarsal slips laterally almost without force.

The plantar fibrous flap on the medial side has now become too wide, A sufficient amount of it will be resected and it will be sutured under tension to the dorsal fascia.

In the reduction of a severe metatarsus varus, the internal Sesamoid, with the tension of the plantar fascia can reach the internal margin of the head of the first metatarsal. It should be removed or a part of it, at least, should be removed in this situation.

SLIDE-6

These radiographs show a patient of Dr. Jones before and after this operation. The Hallux Valgus is well corrected. The metatarsus Varus is also well corrected. The internal Sesamoid has been removed. This patient began ambulation on the third post-operative day.

In three percent of cases, the Metatarsus Varus resists the reduction after liberation of the Sesamoids. In these cases, it may be sufficient to open only the capsule of the first metatarsocuneiform joint to allow the correction.

In very rebel cases, this metatarso-cuneiform joint can be held open by inserting on its internal side, a little wedge of bone obtained from the exostosis.

The Abductor Hallucis tendon is sectioned at his distal insertion and it is transplanted to the medial aspect of the first phalanx closer to the dorsal, than to the plantar surface on a plane above its normal insertion.

This transplantation should correct the torsion of the great toe and help maintain the correction of the Valgus deformity.

The skin is then apprximated.

A fairly padded gauze bandage is applied and maintained with 1-2 circles of elastoplast applied a little tight.

This dressing is changed the second post-operative day. At this time, only minimum gauze is applied just over the wound and the metatarsals are again encircled with 1 or 2 circles of well aerated elastoplast applied like a metatarsal pressure cuff.

A wedge of gauze in the space between the first and second toe should not be applied. The wisth between the first two toes can favor a recurrence.

The ambulation of the patient can be almost immediate. It is a matter of sensitivity. Most of the patients will ambulate from the third day to the sixth post-operative day.

The POST OPERATIVE TREATMENT is very essential. Traction movements of the great toe, movements of circumduction (always pushing medially), and passive and active flexo-extension should be started a few hours after operation and carried on several times a day.

Movements of pre-hension to re-educate the interossei, elevattion and walking on tip-toes are also outlined for the recovery program. These exercises should be practiced daily for two months.

The dorsal extension of the great toe should be sufficient to allow the use of high heel shoes. Some women will never forgive their surgeon for such limitation!

The advantages of this operation can be summarized in a few points:

1. Maximum of simplicity and minimum of operation time required.
2. No immobilization of the foot is required.
3. The interruption of activity is reduced to a minimum.
4. Both the esthetical and functional results are very satisfactory.

Only a few possible complications can occur and they should be mentioned because they are preventable. They are:

1. EDEMA : It lasts only 3 or 4 days, and can be reduced by a little massage, elastic bandage, and so on. It is annoying only psychologically as it limits the use of shoes.
2. THE RIGIDITY OF THE NEW JOINT can develop in those patients who instinctively avoid weight-bearing on the operated area. Early mobilization and walking are the best prevention.

3. PAIN OF THE NEO-ARTHRITIS: Is found in 2% of the cases. One intra-articular injection of Hydro-Cortisone abolishes the pain in 1 or 2 days.
4. MEDIAL SUB-LUXATION OF THE FIRST PHALANX: This complication occurred only in one of our first patients.

SLIDE-7

Those are x-rays of this patient before and after surgery. In spite of this sub-luxation the esthetical result is satisfactory and the patient stands on her feet most of the day without any complaint. She was operated upon 10 months ago.

This sub-luxation can be prevented if three facts are kept in mind:

1. No wedge of dressing should be put between the first and second toes.
2. The osteotomy of the exostosis should not remove too much of the head of the first metatarsal.
3. In doing the transplantation of the Abductor Hallucis, the tendon should be sutured without too much tension. We think this caused the sub-luxation in the case shown here.

However, with diligence and attention to details such accidents can be avoided and the results can be very satisfactory, as shown here.

SLIDE-8

Lelievre says, and I quote, "a woman sufficiently energetic should cover 500 yards from the 8th to the 10th day - one-half to 1 mile from the 15th to the 20th day.

She can dance at the end of the second month and climb a mountain at the end of the fourth month.

In the cases we have done with Dr. Jones and Dr. Blunden, the patients have fulfilled such promises except for climbing mountains - an activity in which they were not interested.