Partial Foot Amputation for Severe Deformity Caused by Congenital Absence of Fibula

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This case represents one of congenital absence of the fibula associated with anterior tibial bowing, shortening of the tibia with deformity of the residual foot characterized by lateral and posterior displacement of the foot with pulling of the heel upward into a position such that the plantar surface pointed directly posterior. Due to the severe contracture of the tendo achillis, the heel pad was proximal to the distal end of the tibia. There is three inches shortening of the femur. The foot had three toes. There was some external torsion of the femur, a 10 degree flexion contracture at the knee with genu valgum.

When first seen in our Amputee Clinic, at the age of eight, the patient was wearing a Thomas splint with an ischial bearing pelvic band and a thigh cuff.

X-rays showed a hypoplasia of the right femoral shaft with atrophy of the pelvic girdle and femur. The fibula was absent; the tibia foreshortened with marked anterior medial bowing of the lower two-thirds of the tibial shaft. The os calcis and talus was fused into one bone. X-rays of the spine showed an incomplete fusion of the posterior neural arch of L-5, and the upper sacrum.

Before surgery the patient was fitted with a prosthesis with knee joints and thigh corset. The upper portion of the socket consisted of a molded leather corseting and lacer which permitted full-end bearing; however, the toes and metatarsal area of the foot protruded laterally, extending over the leather socket and bulging underneath his trousers. Aside from this, the patient walked very well and attended school. He occasionally got a little irritation over the sharp bowed crest of the tibia. His major complaint was that of the protrusion of his foot outside the prosthesis with bulging of his trousers, and the bulkiness of the prosthesis, which had to accommodate the deformed foot.

He returned to the clinic at the age of sixteen expressing the desire to have a procedure performed that would eliminate the bulge of the prosthesis and the foot under the trousers.

We had the choice of going ahead with the original plan of doing a two-stage procedure, first correcting the bow of the tibia and then doing a Syme amputation. However, several considerations were analyzed. First of all, the patient was doing very well with the prosthesis as it existed with excellent end bearing on his own original skin. He had no pain. His gait was good. He was able to attend school and participate in all activities. Secondly, the heel flap was pulled markedly superior, proximal to the distal end of the tibia and it was considered surgically difficult to bring the displaced heel flap down over the tibia.

The basic requirements of the case were as follows:

1. To give a good, competent end bearing stump.
2. To reduce or eliminate the sharp bow of the crest of the tibia.
3. To eliminate the need of a thigh corset.
4. To remove the protruding foot, as described.

If we did an amputation through the mid-tarsal joint, this would place the foot in line with the longitudinal contour of the leg below the knee. It would also preserve a larger surface of end bearing skin, including the heel flap, that would remain undisturbed and would represent the original tissue that had been successfully bearing weight on the end ever since the patient had been using a prosthesis from the age of eight.

There is one other factor which convinced us that this procedure might have some merit—the factor of the value of the hook (as represented by the deformed position of the heel and the hind foot)—that this hook would act as a suspension device for a simple but adequately designed prosthesis, which would eliminate the need for any thigh corseting or possibly eliminate the need for a patellar strap.

The case was thoroughly discussed with the parents and the patient and they both agreed that they would prefer to have the partial foot amputation; that, if it did not succeed, we still could do a Syme amputation and we would not have lost anything except time and effort, and possibly we would have gained certain advantages, as described.

At this time, a mid-tarsal disarticulation was performed back to the joint formed by the fused astragulus and os calcis. The sharp crest of the tibia was diminished by osteotomy. All incisions healed per primum.

He was then fitted with a special plastic prosthesis. The patient returned to school and did very well. He was satisfied with the restoration of relatively normal countour to his stump and there was no longer any bulging of his trousers. He had no pain. The anterior crest of the tibia no longer gave him any trouble. The stump was end bearing and there was definite hook type function to the deformed residual foot.

X-rays were taken of the amputation stump with the prosthesis on—both weight bearing and without weight bearing with the patient holding the prosthesis suspended off the floor. These x-rays clearly demonstrate that there is a definite hooking of the socket by the posterior heel, giving security to the suspension by means of the contour of the socket over the residual heel. This hooking effect was also analyzed by using a smudge transfer technique by which a lipstick smudge was applied to the posterior-superior margin of the heel without a stump sock. The patient got into his prosthesis and the transfer was applied to the undercut of the socket to clearly show true hooking function of the residual foot stump. The minimum amount of piston action of the stump in the socket was also demonstrated by the x-rays.

Summary

The above case report indicates a technique of solving the problem of severe deformity incident to congenital absence of the fibula—not by Syme amputation but by partial foot amputation, leaving the hind foot in its deformed position with the purpose of giving a special type of moulded socket and utilizing the deformed position of the hind foot as a suspension device. This so far has successfully solved this patient's problem. We are following the case and plan to submit an additional report after a number of years.

It should also be mentioned that if further trouble is encountered, we can always have the Syme amputation since the heel pad has not been disturbed by the partial foot amputation. The authors feel that this will be unnecessary, since our result to date has been gratifying. The prosthesis has been functional and cosmetically accepted. The dynamic type of fitting allows the patient to bear weight on the residual foot, affording a more comfortable and secure application, since the surface area for weight bearing is greater than that of a Syme amputation.

The prosthesis was plastic, with a conventional foot. A patellar cuff suspension will be provided after the planned removal of the waist belt.

"To P.T.B. or Not To P.T.B."

With Apologies to William Shakespeare's "Hamlet"

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On reading the article "The Decline and Fall of the P.T.B." by Dr. Robert G. Thompson, M.D. (O.P.A.J. March, 1965), a question posed by Dr. Eugene Murphy regarding the "Weiss technique" comes to mind and it might be asked "What was the P.T.B. which declined and fell?"

P.T.B.'s have been prescribed and supplied by the limb fitting facilities of the Repatriation Department (the equivalent of the U.S.A. Veterans Administration) in the Commonwealth of Australia since 1961 and in the last 12 month period 437 were issued. However, great stress has been placed on the necessity to follow the principles of cast taking, cast modification, alignment and walking re-education as taught to officers of this Department at a U.C.L.A. Prosthetic Course. All stages of casting, modification and manufacture are supervised to ensure that the patient receives this particular concept of a P.T.B.

Not only have these prostheses proved more functional, more comfortable, and more economical, but they have enabled short stumps to be fitted which previously were precluded from wearing below knee prostheses. In fact, quite a number of patients with "kneeling" prostheses, some of quite long standing, have been fortunate enough to be able to change to below knee fitting.

Contraindications in our experience have been minimal and virtually confined to the relatively rare unstable knee (these are fitted with "conventional" prostheses and not "P.T.B.s" with side irons). Few patients have had the misfortune of being unable to enjoy the excellent function and comfort of the P.T.B.

Problems are encountered from time to time as with any patient and any prosthesis, but it is thought that the fault lies, not with the prosthesis or patient, but in our own shortcomings.

Mr. W. Tosberg in his article "Temporary Prostheses" (O.P.A.J. June, 1965) gives timely warning of an impending "decline and fall" in prosthetic treatment in pointing out that "temporary" prostheses *must* be constructed with full consideration of proper fit and alignment, and the anatomical and biomechanical requirements.

With respect, might not Dr. Thompson's P.T.B. experience be a case of "How a good meaning may be corrupted by a misconstruction."