A NEW LOOK TO AND THROUGH THE ABOVE KNEE SOCKET, Dr. G. W. Mayfield (Tripler Army Medical Center, Honolulu, Hawaii 96438), J. Scanlon, RPT, and I. Long, C.P.O. The degree of hip adduction/abduction of the stump of an AK amputee wearing a prosthesis cannot be accurately evaluated by physican examination. To answer the question of hip and femur position in the fitted socket the following X-ray technique was devised. An A.P., 14"x36" X-ray of the pelvis, hips, femora and knees is obtained with the amputee standing, heels 2 inches apart with the weight distributed equally on the prosthetic and normal extremity. Measurement of the degree of hip adduction/abduction is done as illustrated below and the location of the femur in relation to the socket wall is noted. Optimally the amputated side hip should be in adduction equal the opposite hip (7 to 12 degrees) and the femur supported laterally over as large an area as possible with relief for the distal end. (Fig 1)

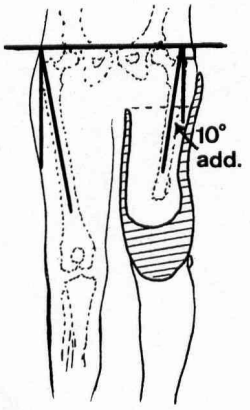

Fig 1

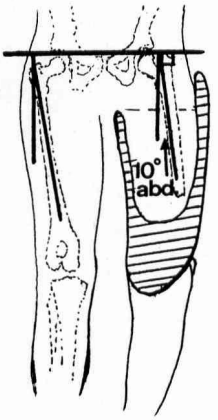

Fig 2

An initial group of 38 amputees wearing prostheses constructed utilizing standard techniques of fitting and alignment were evaluated by this X-ray method. The prostheses had been made by many different prosthetists in various facilities. X-rays of 26 (68%) of this group revealed the hip to be in absolute abduction and usually there was poor lateral socket wall support. (Fig 2) 4 (11%) of the hips were neutral; 5 (13%) were in adduction but less than the sound side and 3(8%) had adduction equal to or more than the sound side. A compensated Trendelenberg type gait (trunk shift over affected side) was more severe in those amputees fitted with the hip in abduction. Based on these findings a revised fitting technique was devised contouring a slightly convex inward lateral wall to support the femur against lateral thrust and emphasizing hip adduction during socket manufacture. (Fig 1) The A.P. socket dimension is increased to accommodate soft tissue displacement as the M.L. dimension is decreased. The knee/shank/foot unit is displaced lateral to the distal end of the socket and as the foot is brought toward the midline hip adduction is assured. Hip adduction during stance phase of gait provides optimum pelvic stability in the frontal plane reducing the trunk shift over the amputation side. Twenty of the 38 patients were fitted with the revised techniques. Each had a significant improvement in the adduction of the hip in the socket, improved lateral wall support and improvement in gait. The gait was analyzed by experienced observers with the amputee wearing the old and new prosthesis alternately. All twenty of these amputees commented on an increased "feeling of stability" with the new fit and alignment. A second group of 13 previously unfitted new amputees were fitted by the revised techniques and X-rays revealed adduction of the hip in all cases. This X-ray technique provides an objective method to determine hip adduction/abduction providing a basis to alter prosthetic fitting and alignment to improve pelvic stability in the frontal plane and consequently AK amputee gait.

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