

## Recollections of Fitzsimons Army Hospital and the Origin of the X-ray Checkout of the Above Knee Limb

At [Fitzsimons Army Hospital](#) in 1974, the Orthopaedic Services was caring for a large number of Vietnam casualties both amputees and major fractures, etc. I was in charge of the amputee service at Fitzsimons Army Hospital and ran the amputee clinic. The reason we had such a large population of Vietnam amputees and essentially developed an "amputee center" is based on the fact we did not discharge many of these patients to the Veterans Administration Hospitals. The reasons I don't exactly remember, but I think there was some element both on our orthopedic staff and also on the patient's part they would get "better" treatment in a facility where we were doing some original research in prosthetics and had the availability of a number of prosthetists (about 4 or 5 at each clinic) from the Denver area. Our Chief of Orthopedics, William Burkhalter, was an extremely energetic, thoughtful individual who was always exploring and promoting newer and better modes of treatment, i.e.: the internal fixation of fractures even in the face of open wounds, as well as our prosthetic research in a better AK socket, myoelectric upper extremity prosthetics, etc.

We also had, at that time, innovative methods of amputee rehabilitation as alluded to in my chapter in *Orthopedic Surgery in Vietnam*. The Germans had used amputee skiing as a rehabilitation method after WW II and it was initiated the year before I arrived at Fitzsimons by Col. Brown. I assumed the responsibility for the program when I arrived and during the winter months, I ran the program, teaching amputees to [ski](#) utilizing special skis and other equipment. In the non-snow months of summer we had a [horseback riding](#) program.

At Fitzsimons, we had a few Vietnam casualties with united fractures of the femur who's ambulation was characterized by the typical "gluteus medius weakness gait" with the body weight shifting over the affected side during weight bearing on the affected side. I had a theory this abnormal gait was related to a [mal-rotation union](#) of the femur with the distal part of the femur united in relative internal rotation as relates to the proximal portion including the greater trochanter where the short hip abductors insert. Therefore, the origin of the standing weight bearing X-ray of hips and femora was a method of determining the amount of mal-rotation. The amount of mal-rotation did correlate with the clinical evidence of gait abnormality, i.e.; a shift over the affected side of the body weight.

So, how do the above studies have anything to do with Ivan Long's "[Long Line?](#)" To my recollection, Ivan and I discussed at length the hip abduction problem in AK amputees causing the same hip abductor weakness problem as the patients with rotational mal-union of fractures. We decided to apply the same [X-ray examination](#) as was being done for the femoral fracture mal-rotation study to a series of the AK amputees at Fitzsimons while they were wearing their prosthesis. We (I don't recollect whose idea it was to do it) added a thin strip of lead tape inside the socket especially along the [lateral wall](#) and the [ischial area](#). The tape along the lateral wall gave us an indicator of just how much the lateral wall shape contained the soft

tissues and femur with subsequent pressures laterally to maintain the hip in adduction.

It was Ivan Long who originally came up with the "[revised quad socket](#)" concept. I was also deeply interested in trying to improve socket design and he and I had extended discussions about the revised design, but it was his ideas that the design was built on, not mine. It is my recollection, those amputees with a narrow A/P dimension, (soft tissues displaced anterior/posterior) and a well convexed curve of the socket in toward the shaft of the femur maintained the hip in a better adducted position and improved gait.

The paper "[A New Look To and Through The Above Knee Socket](#)" was based on Fitzsimons X-ray data. It was prepared and presented after my transfer to Tripler Hospital as noted on the cover sheet and the fact I quoted Ivan Long's [paper](#) of Dec. 1975. It was never published other than in the form of the abstract as published in [Orthopaedic Transactions](#). Having somehow never saved a copy myself, I am delighted it has turned up and thanks to Jim Scanlon for saving a copy. To my recollection I did the typing and the illustrations, as I submitted this to the AAOS for presentation at the [Annual Meeting](#). Concerning authorship: I wrote the "paper" independent from any direct manuscript input by Long or Scanlon, although I gave them credit as "co-authors" based on our multiple collaborative discussions concerning the subject.

In summary, I continue to believe a supportive lateral wall with increased A/P diameter fitted with the hip in adduction in AK amputations, and with appropriate out-set alignment of the foot, can improve the biomechanics of the muscles about the hip to decrease or negate the "abductor lurch" gait patterns seen in so many AK amputees. Obtaining an X-ray examination of the affected extremity in the socket as described in our study verifies the proper fit and alignment.

Sincerely,

A handwritten signature in cursive script, appearing to read "Gerald Mayfield".

Gerald (Jerry) Mayfield, MD, Col (Ret) MC USA