

# Factors Affecting the Adjustment of Lower Extremity Amputees to Their Prostheses

By MILES H. ANDERSON, Ed.,D., JOHN J. BRAY, C.P. & O.  
and DONALD F. COLWELL, C.P.

*Prosthetics-Orthotics Education Program, UCLA*

How many socket revisions to accommodate stump shrinkage will be necessary over how long a period of time before the stump stabilizes? is one of the most frequently asked questions in the prosthetic clinic. A reliable prediction of the number of socket revisions and the length of time required to achieve stability for any given patient would make it possible to plan his total rehabilitation program intelligently and to make accurate estimates of the cost of his prosthetic rehabilitation.

The UCLA Prosthetics-Orthotics Program has kept records of several hundred cases of both total contact plastic socket above-knee and patella tendon bearing below-knee prosthesis wearers, and review of these records indicates a wide variation in the number of socket revisions needed, and the time required to achieve stability. It is impossible to make a general statement that will be useful in all cases, or even in a large proportion of cases.

A few conclusions can be drawn from our total contact plastic socket AK experience that seem to be applicable much of the time, but not invariably, as follows:

1. The fatter and flabbier the stump, the greater the amount and number of socket revisions that will be required; the harder and more muscular the stump, the less will be the need for such revisions.

2. Patients with poor circulation and a tendency to accumulate fluids in the stump are more difficult to stabilize than those with good circulation and less tendency for fluids to accumulate.

3. Active patients go through the adjustment period more rapidly than those who are sedentary. Activity is greater with amputees who have received gait-training therapy than with those who have not received adequate training.

4. Patients who have had good post-operative care, including stump bandaging and proper exercises to prevent edema, accumulation of fat, muscle weakness, and flexion and abduction contractures will require fewer socket adjustments and will stabilize more quickly than those who do not receive such treatment.

5. Patients who follow a proper diet and exercise program to prevent variations in weight and muscle tone require fewer adjustments, and this continues as long as they are prosthesis wearers.

6. Patients who are fitted with a total contact quadrilateral suction socket require fewer adjustments over a shorter period of time than those fitted with an air chamber type quadrilateral suction socket.

7. Patients fitted with a quadrilateral non-suction socket with pelvic belt and stump sock can usually get along fairly well by adding and removing stump socks, and this is done for some patients who are old and weak, or who live far from a prosthetic facility.

8. An "old wearer" of a well-fitted and aligned quadrilateral suction socket prosthesis rarely offers much of a problem in fitting him with a replacement when his old prosthesis wears out. An old wearer of a poorly fitted and aligned prosthesis who has developed an "adductor roll" and other problems, such as edema and skin lesions, will usually require many adjustments before his stump becomes normal. A "fresh amputee" will usually require more adjustments than a well-fitted old wearer, but fewer than a poorly fitted one.

We have fitted several hundred patella tendon bearing below-knee prostheses during the past few years, and all of the eight points made above regarding the above-knee prosthesis wearer apply to the PTB wearer, with one exception. The weight changes mentioned in "5" caused by failure to stay on a consistent diet are not a very serious factor in the fit of a PTB socket as compared to an AK, the reason being the relatively smaller amount of fat-accumulating type tissues around most BK stumps.

The average AK or BK amputee in the group we have fitted required four modifications of the socket to accommodate to stump shrinkage during a period of from nine to fifteen months, at which time the stump stabilized and a new socket was made and fitted. We have had a few that arrived at this point in as little as one modification over a period of three months, and have had a few "problem cases" that arrived at this point after twenty-two modifications to a succession of four sockets over a period of forty months.

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## In Memoriam

MRS. OTTO BOCK

Statement by AOPA President  
Robert C. Gruman, C.P.

"The Association has learned with regret of the death on June 3 of Mrs. Otto Bock, wife of the founder of the organization. Our sincere sympathy is extended to her son-in-law and daughter, Mr. and Mrs. Max Nader."

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Oscar E. Fann, C.P., died November 23, 1963, at the age of 43. He was certified in 1949 and had been employed at the Atlanta Artificial Limb Company and previously with J. E. Hanger Company in Birmingham.

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Henry T. Hertsch, C.P., died April 12, 1963, at the age of 56. He was

certified in 1952 and was an employee of the Veterans Administration in New York City.

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Louis Kaplan, C.O., (Certificate No. 163), died on April 7, 1964. Mr. Kaplan had been associated with the Veterans Administration in New York City since 1938. He became interested in orthotics as a young man in Germany, and had been associated with the George Dorsch Company after his arrival in the United States in 1931. He is survived by his wife, two daughters, and grandchildren.

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John C. Russey, C.P.O., died of a heart attack after a short illness, March 6, 1964. He was born in 1888 and most recently had made his home in Van Nuys, California.