# Evaluating the Temporary Pylon and Permanent Prosthesis in a Rehabilitation Amputee Clinic

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We in vocational rehabilitation need to stop occasionally and examine our procedures with a critical eye. We get engrossed in the job at hand, and find it amazingly easy to neglect determining whether there might be a better way to accomplish a task, thereby improving our services to handicapped people.

Recently, we decided to look at our amputee clinics in an attempt to evaluate two methods being used to fit recent lower-extremity amputees with prostheses. We had been following the conventional, medically recommended policy of seeing the amputee after the stump had healed and shrunk. At that time, the amputee was instructed in the proper method of wrapping the stump with elastic bandage to aid shrinkage, and the clinic chief determined when measurements for a prosthesis could be obtained. This seemed to be the way to prepare an amputee for an artificial limb. However, prosthetic clinic teams in other parts of the country began using a temporary pylon, or preparatory prosthesis, instead of wrapping with an elastic bandage, with good results. We felt the need to evaluate those two methods with the following questions in mind: What are the actual costs in each case? Which procedure permits the amputee to work sooner? From the medical viewpoint, does one method of fitting an amputee have advantages over the other?

In the past, when shrinkage was induced by wrapping the stump with elastic bandage, it was necessary to replace the socket or the entire limb on most new amputees within the first year. Even though the stump had shrunk to a point where a permanent prosthesis was indicated, problems began when the patient started weight-bearing and gait-training. Pressure from use of the prosthesis caused further changes in the stump; the new, expensive socket ceased to fit, and a new one had to be ordered. While waiting for the new prosthesis, the patient often had to "mark time."

Early fitting with a temporary pylon solves some of these problems. First, the amputee is spared the long period of waiting and wrapping before weight-bearing is permitted. The stump shrinks much more quickly, and the temporary pylon enables gait-training to begin almost immediately. When the permanent prosthesis is finally provided, we have avoided the purchase of a second permanent prosthesis. Often, the foot that was on the pylon can be used again, and in some cases other component parts can be converted to the permanent limb.

We know that amputees can return to work sooner if they are provided with a pylon first and started on a program of physical therapy, including gait-training. This seems to be a very significant factor, since it not only brings in family income sooner, but also increases rehabilitation benefits by improving the client's overall outlook regarding services. Many clients return to work with the temporary pylon even before obtaining the permanent prosthesis.

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Regarding the medical aspect, the physicians tell us that there are fewer medical problems in cases where clients are provided with a temporary, or preparatory, prosthesis. The healing process is enhanced, and many of the circulatory difficulties that could arise are avoided because regular short walking periods are possible, and the patient does not have to be inactive. Contractures no longer present a medical problem, and edema is reduced after initial fitting with the pylon.

In addition to these important factors, we needed to ascertain the outcomes for clients served by the two procedures. This is the only logical way to determine comparative costs. We needed to find out how many clients required a new limb the first year under the old method, how much sooner pylon wearers returned to work, and whether fewer gait-training sessions were required using the temporary pylon method.

We reviewed the records of 23 amputees who had received the permanent prosthesis originally and compared these with 23 new lower-extremity amputees who had been fitted with pylons. Charts were made and the individual case was reviewed, which provided information shown in Tables 1 and 2.

Of the 46 cases reviewed, the amputees fitted with the temporary prosthesis passed final checkout in the clinic 9.4 months sooner from date of amputation than did those who received a permanent prosthesis.

Temporary-pylon wearers received the final permanent prosthesis 8.3 months sooner than the 23 who were treated in the conventional way. (Three amputees required new sockets, each due to excessive weight gain. One was refitted three months from date of initial fitting with a permanent prosthesis, another at four months, and the third at five months.)

The total cost for rehabilitation per patient was $75.87 higher when early fitting was carried out. Not reflected in this cost, however, is the fact that permanent prostheses for the early-fitting cases cost $65.00 more than those for the control cases, an amount which almost offsets this difference. Furthermore, there were 11 above-knee amputees in the early-fitting group, and only 7 in the control group. When the additional cost of above-knee prostheses, which is $100, is taken into account, the

TABLE 1. CHARACTERISTICS OF AMPUTEES STUDIED

| | Conventional Fitting ($N$ = 23) | Early Fitting ($N$ = 23) |
|---|---|---|
| Male | 17 | 13 |
| Female | 6 | 10 |
| Average age | 39.9 yr | 41.6 yr |
| Median age | 35.0 yr | 44.6 yr |
| Below-knee amputation | 16 | 12 |
| Above-knee amputation | 7 | 11 |
| (Reasons for amputation) | | |
| Accidental injury | 14 | 7 |
| Vascular insufficiency and arteriosclerosis | 1 | 6 |
| Bone tumor | 1 | 1 |
| Diabetes | 4 | 4 |
| Cellulitis gangrene | 0 | 1 |
| Osteomyelitis and post-fracture infection | 3 | 4 |

TABLE 2. COMPARISONS BETWEEN CONVENTIONAL AND EARLY FITTING OF LOWER-EXTREMITY PROSTHESES

| Time and Costs | Conventional ($N$ = 23) | Early ($N$ = 23) |
|---|---|---|
| Elapsed time from amputation to initial fitting | 7.0 mo | 4.8 mo |
| Elapsed time from initial fitting to 2nd prosthesis | 10.4 mo | 3.9 mo |
| Elapsed time from amputation to 2nd permanent or final prosthesis | 17.4 mo | 8.7 mo |
| Elapsed time from amputation to final checkout | 21.0 mo | 11.6 mo[c] |
| Average cost of rehabilitation per patient | $599.78[b] | $675.65 |

[b] Includes 3 amputees who required new sockets.
[c] When this figure is adjusted for increase in price between the time of the fitting of the two series and for the difference in price between AK and BK prostheses, it becomes $682.17.

average cost of prostheses for the patients fitted early is actually about $17 less than for those fitted conventionally.

The average time for gait-training, from 20 to 30 hours, was cut in half when temporary pylons were used, thus saving these costs.

Of the 23 amputees who received permanent prostheses in the conventional manner, 18 required a completely new limb in 10.4 months. The remaining 5 required new sockets. This indicates that most new lower-extremity amputees will need a second replacement limb no matter which of the two methods is used.

## CONCLUSIONS

The cost of the rehabilitation is almost equal, whether conventional methods or early-fitting procedures are employed. The amputee who receives a temporary pylon is able to ambulate and accept a final prosthesis much sooner. The most important benefit, however, is his ability to return to employment 9.4 months sooner. Obviously, the client then can aid in the support of the family sooner and become a productive tax-paying member of society.

Medical complications such as contractures and circulatory difficulties are minimized when an amputee can begin weight-bearing as soon as the condition of the stump will allow following amputation.

Another factor that should be mentioned is one which we must assume since it has not been proven. We enhance the psychological outlook of an amputee or any client if we can speed up the process of rehabilitation involvement. By getting an amputee up on a limb sooner, the long waiting period is avoided, and the amputee finds that his ability to walk has not been lost. This in itself often provides the incentive and desire without which few cases are successfully rehabilitated.

Finally, it should be noted that the average elapsed time between amputation and fitting was 4.8 months. It is felt that even better results could have been obtained if these patients had been referred for fitting much earlier.