

Motion Control

Who Is An Appropriate Candidate for a Myoelectric Arm?

Evaluation of Candidates

Site selection from the remnant musculature of the amputee is one of the first steps in evaluation for a myoelectric prosthesis. Minimum EMG signal for operation of the elbow/hand prosthesis is a 15 μ V EMG difference between the two control signals. Careful probing with a sensitive EMG tester (such as the [MYOLAB II](#)) is necessary to identify all potential control sites, since fitting considerations may rule out some sites. The evaluator should be thoroughly familiar with the anatomy of the arm and shoulder so that the remnant musculature can be accurately identified and the patient properly instructed to contract the muscle being tested.

Motivation and Psychological Adjustment

It almost goes without saying that the success of any prosthesis depends a great deal upon the patient's own motivation. Motivation is difficult to assess, and many clinics feel that merely participating in the fitting steps, such as muscle training, demonstrates adequate motivation. Others require consistent use of a conventional prosthesis before a myoelectric limb will be fit. That strategy, indeed, resolves many questions about the patient's motivation (and provides a backup prosthesis as well), but risks denying a myoelectric limb to some who could use it, but cannot or prefer not to use a conventional prosthesis. We feel that a [trial fitting](#) can answer many of the same questions.

Realistic orientation (with all appropriate optimism) is also important, and if the patient is not aware of the details of the fitting process, then he should be informed of both the capabilities and the limitations of the prosthesis. If available, experienced prosthesis users who are willing to talk with a new amputee can give a realistic point of view and can offer inspiration to a new amputee who may have doubts about his future.

Counseling or therapy to aid amputees in their adjustment may be helpful, especially if the amputee

Size and Strength of the Individual

The [Utah Arm](#) has been fitted to patients as young as 13 years old and may be suitable for some even younger, but the forearm length cannot be shortened beyond 8 inches (20.32 cm). The finished weight of the a Utah Arm is about three to four pounds, depending on the terminal device used, and the individual should be capable of supporting this amount of weight. For individuals of slight stature, a body-powered prosthesis may be indicated to minimize the weight at the distal end of the forearm. Neuromas and phantom limb pain may be complications in some patients and should be carefully evaluated if they are exacerbated with the use of the prosthesis. Higher level amputees, e.g., shoulder disarticulation, may experience muscle cramping in the trapezius due to weight or suspension forces. Muscle strengthening with exercise and/or redesign of the socket may make the weight more tolerable.

The questions that arise in the evaluation of patient often cannot be answered by physical examination alone. For some patients, a trial fitting is the only way to assess questions such as the comfort of wearing a prosthesis day-to day, or the motivation to utilize the prosthesis regularly. In short, the trial fitting can be used to verify the tendency of a patient for the Utah Arm or for a particular TD. Also, if the patient proves to be inappropriate for the first components tried, other components may be substituted, usually using the original trial socket with several different components.

The [Trial Fitting](#) as an Evaluation Device

Trial fittings typically involve the fitting of temporary socket, which should be substantial enough to be used for several months. (We presently fabricate above-elbow temporary sockets with vacuum-formed plastic like Surlyn, with a reinforcing outer layer of fiberglass casting tape.) The trial period also includes the initial training period and should be continued long enough to allow the patient to adapt to using a prosthesis in daily life, which in our experience suggests a 1- to 6- month trial period.

[Funding Issues](#)

A candidate for a myoelectric prosthesis must also have adequate funding to pay several times the cost of a body-powered prosthesis. Experience shows, however, that health insurance, or other third-party payers, will fund a myoelectric prosthesis if properly prescribed and justified to the insurer. We recommend that if the patient's policy includes prosthetic benefits, the physician's prescription and a detailed letter of justification be submitted to the insurer, along with the estimate for the costs of the prosthesis. We have found that insurers appreciate the "success guaranteed" nature of the trial

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does not communicate well with the other fitting team members. If the clinic team or fitting center does not have training in psychology or counseling, adjustment problems can be particularly baffling. Typically, we may see the technical aspects of the fitting progressing, but the patient is not making the expected progress in his rehabilitation. The patient may need professional help in working through their adjustment problems, or perhaps just more time to solve their problems themselves or with their families. In any case, the fitting process may be blocked indefinitely until the patient is psychologically ready to progress.

Skin Condition

Myoelectric signals can be obtained even through scar tissue. However, care must be taken to ensure that the scar tissue does not break down either under the weight of the prosthesis or from pressure under the electrodes (Low profile electrodes are supplied with the Utah Arm for use in such cases.)

fitting process just described. A fitting center or clinic can perform such a trial fitting (using rental of "spare" components) and return the majority of the costs to the insurer if the patient is shown by the trial fitting not to be an appropriate candidate.

Call Motion Control for specific questions regarding suitability of clients for a Utah Arm at [1.888.MYO.ARMS](tel:1888MYOARMS) (696.2767)