now. Are you satisfied with application of outdated techniques, or are you willing to enter a new era of prosthetic and orthotic practice? The choice is yours.

AUTHOR

Timothy Staats, M.A., C.P., is Adjunct Assistant Professor and Director of the Prosthetics & Orthotics Education Program at UCLA, Rehabilitation Center, 1000 Veteran Avenue, Rm 22-41, Los Angeles, CA 90024.

Editorial

The Role of Test Socket Procedures in Today's Prosthetic Practices

by Michael J. Quigley, C.P.O.

The proper role of a test socket procedure is a controversial topic in today's practice of prosthetics. A test socket procedure can be defined as that stage in the design of a prosthesis when a socket is fabricated solely for the purpose of determining proper socket fit. Although test sockets were originally used for upper limb prostheses, the true advent of the test socket was in 1972 when Mooney and Snelson[1] described the polycarbonate clear test socket as developed at Rancho Los Amigos Hospital. During the 13 years since that article, the proper role of the test socket procedure has still not been defined.

There are several reasons for the controversy over test sockets. First, when a test socket procedure is done, there is an implication that the mold, mold modifications, and socket design principles instilled in the prosthetist may not be correct. After all, if the prosthetist's techniques were perfect, the socket would fit perfectly and the need for a test socket would be obviated. However, any time a clear test socket is used, the prosthetist immediately notices a few things he would like to change in the definitive socket or, in some cases, the next test socket.

It is safe to say that the majority of United States prosthetists believe in the value of test sockets and use them on a regular basis. Indeed, insurance companies and most other third party reimbursers, including Medicare, pay for test sockets, thereby recognizing twin values. A test socket procedure makes good sense, and there is no question that it improves prosthetic fitting. However, it is also true that many prosthetists do not use these sockets, or use them only rarely. The group that does not use test sockets feels that they can fit nearly all prostheses well without test sockets and do not want to spend the additional effort that test sockets require, or they simply do not want to change the methods they learned many years ago. The present Veterans Administration's (VA) procedure for obtaining approval for test sockets seems to favor this latter group, since it is an intentionally cumbersome system that, in effect, discourages test socket procedures on VA patients.

Test socket users also include prosthetists who routinely use multiple test sockets on every patient, with the principle that each successive socket brings you one step closer to the perfect fit. If one test socket procedure is good, shouldn't two be better? Or three? Or more? This is a major area of controversy that could be discussed here but not resolved. Probably the best example of this use of test sockets is at the Institute for the Advancement of Prosthetics (IAP) in Lansing, Michigan (although a number of other prosthetic practices are also using multiple test sockets, or featuring them as a type of "first class" service).

An average of six test socket procedures are done on each patient in Lansing: beginning with static fittings in clear sockets with the patient

wearing no prosthetic socks, going on to clear socket dynamic (walking) fittings, and progressing to a definitive socket with a gel liner for below knee amputees. The patient is seen every day for two to three weeks until the socket fit is perfected, and only then is the prosthesis finished. This, of course, is an expensive undertaking, but it seems logical to assume that with so much time and energy spent, the patient would end up with a better fit. The multiple test socket users lead an utopian existence, seeking the perfect fit, and see only one or two patients every week or continue fittings for many months if they are seen only on a weekly basis. For the average prosthetist who fits 100 or more patients alone each year, the sheer logistics of using multiple test sockets on every patient is staggering.

Another area of controversy regarding test sockets is that they provide an incentive for prosthetists to delay being satisfied with the socket fit if they are paid separately for every test socket used. If they fit six test sockets, they are paid six times more than if they fit one test socket. The only response to this problem is that there are a few difficult cases where the only way a good fitting can be achieved is with multiple sockets, and the prosthetist should be reimbursed for his effort. On the other hand, there are always the few people who will abuse the system. In practice, less than five percent of all prosthetists have the time or inclination to routinely use multiple test sockets. After all, there are also very few patients or insurers who want to bear the expense, are able to make all the appointments necessary, and are willing to wait the many months for a finished prosthesis when multiple test sockets are used.

Before summarizing, one final comment is necessary. Having test socket procedures available and using test sockets properly are two different things. There are no standardized, recommended, or documented procedures for the proper use of a test socket. Some people use clear sockets, some do not. Some use "wet fit" procedures with no prosthetics socks; others use prosthetic socks. Some test sockets are used statically, others dynamically. Alginate procedures are used in some areas. Even when a clear socket is used directly against the skin, how do we interpret what we are seeing? The result of the confusion over the proper use of a test socket is that the prosthetist converts one of the few objective tools he has available (a clear socket) into a subjective one by having to use educated guesses to determine the modifications needed to improve socket fit. The whole area concerning the optimum use of test socket procedures is in great need of study and documentation.

In summary, test socket procedures are good procedures. When a prosthetist knows that the socket he is fitting is not the final product, he is more likely to make major socket modifications and, therefore, less likely to provide a poor fitting prostheses. Multiple or successive test sockets will always be required on a few difficult cases. In some areas, the patient and prosthetist will afford the luxury to use successive test sockets to try to achieve the perfect fit, but this will probably include less than one percent of the patient population.

It is obvious that these socket procedures are here to stay and that the use of test sockets will increase as new materials and techniques are introduced. Hopefully, some meaningful documentation will be developed to enable prosthetists to obtain as much information as possible from a test socket procedure. Without a true understanding of how to properly use a test socket, each prosthetist is left to practice and develop his own technique, and the art of prosthetics again overwhelms the science.

REFERENCES

[1] Mooney, V. and Snelson, R., "Fabrications and Applications of Transparent Polycarbonate Sockets," *Orthotics and Prosthetics*, 26 (1), p.p. 1–13, March 1972.

[2] Personal communication, Jan Stokosa, C.P., May 6, 1985, Lansing, Michigan.

AUTHOR

Michael J. Quigley, C.P.O. is President of Oakbrook Orthopedic Services, Ltd. 1 South 132 Summit Ave, Ste 102, Oakbrook Terrace, IL 60181.