

ORTHOTICS IN REHABILITATION

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OALMA has become AOPA. At the National Assembly in Dallas, Texas, it was decided that the Orthopedic Appliance and Limb Manufacturers Association (OALMA) shall be known as the "American Orthotics and Prosthetics Association (AOPA).

The first part of the new name, "Orthotics" and the profession it represents are not as well known to the public as is the second part, "Prosthetics."

Through suction socket courses, the Prosthetics Research Board and training courses in upper as well as lower extremity courses, we have all become very familiar with the work of the prosthetist but *the important work of the orthotist has not been publicized to the same degree*. His work is not quite as spectacular, but, in the opinion of the writer, it requires as much skill, knowledge and ingenuity as that of his colleague, the prosthetist.

It has been said that an orthotist requires knowledge of twenty-seven different trades in order to serve his patients well. There is hardly any material which he is not required to use for one appliance or another. He must be able to operate many metal and woodworking machines and must know the properties of practically every material in order to shape it to accommodate to the needs of the different devices which he has to provide. He must work very closely with the patient as well as the physician, since he will have to construct devices for almost any affected part of the body from footplates to Sayre-slings.

He may be called on to provide an abduction brace for the infant born with Erb's palsy or to construct a brace to unweight a fractured neck of the femur caused by decalcification of the bones due to old age.

The types of braces which may be required cover five major groups. Braces are constructed to: (1) support body-weight; (2) prevent deformities; (3) correct deformities; (4) control involuntary movements; and (5) maintain correct alignment of body segments. This in itself indicates the need for many different designs as well as different materials.

Whereas the prosthetist is primarily concerned with the surface anatomy of the extremities, the orthotist requires knowledge of anatomy as well as kinesiology and physiology of the whole body. A spinal brace constructed for tuberculosis of the spine differs widely from a spinal brace made to alleviate low back pain, although both would be made for the same part of the body. A leg brace constructed for an un-united fracture differs widely from a leg brace needed to compensate for muscle paralysis. The splint for a spastic condition requires a different design from a splint for a flaccid condition.

The materials most widely used are metal, leather and to a limited degree, plastics. For a long time a high grade surgical steel was used almost exclusively in the construction of orthopedic appliances. Only when aluminum was combined with other metals did this material become popular in this field. Since several aluminum alloys are almost as strong as steel, the reduced weight became a great advantage. Duraluminum is strongest in its resistance against bending and compression. Resistance against shear and

friction, however, is rather low compared to steel, and this property has to be considered carefully wherever duraluminum is used. In the selection of metal safety should not be sacrificed for weight.

One of the first designers and constructors of orthopedic appliances who became widely known was Friederich von Hessing in Germany. Braces named after him were rather heavy and complicated. Their main advantage was the fact that they offered almost unlimited adjustment possibilities. These braces required plaster of paris casts from which positives had to be made. Screw plates were attached to the cast and a special type of leather was molded over it. Sidebars were provided with slots. As a result of this construction the brace could be lengthened, shortened, and the alignment of the lower as well as the upper part could be changed almost at will. This brace is rarely, if ever, seen in its original form in the United States today since the indications for such a construction do not exist any longer.

Since the time of Hessing the philosophy of bracing has changed considerably. Through the advances in medicine orthopedic appliances are used more and more to complement orthopedic surgery and not to substitute for it. Physical medicine and improved surgery in many instances has obviated, or at least restricted, need for orthopedic appliances. This in turn has made it possible to make braces lighter in weight and less complicated in construction. In many cases bands can be substituted for closed cuffs; straps and buckles replace long lacers. This makes it much easier for the patient to apply his brace and he can do so in less time.

Certain fundamental principles have to be observed although these differ depending upon the disability and also upon the age of the patient. In a brace made for a patient in early childhood the materials must be light and noncorrosive. One has to consider the need for proper nursing and also the sensitivity of the skin. With advancing age conditions change. The child becomes more active and the proper relationship between the required strength and the weight of the brace has to be kept in mind. The brace should be simple and in the lower extremity especially, the need for extension due to growth has to be considered. Frequent follow-up visits become necessary in order to determine whether or not the brace still fulfills its intended purpose.

In adolescent age cosmesis quite often is of importance and complicated constructions might have to be resorted to in order to make braces acceptable to patients who are very selfconscious as to their appearance.

For the adult it is essential that one consider the patient's social status, his occupation, and also the patient's body weight. For a farmer a leg brace without joints may be proper, whereas the same construction could be very unsuited for a socialite woman with limited occupational needs.

As far as possible, a brace should be comfortable and wherever joints are required it is essential that a mechanical joint correspond to the anatomical joint as closely as such is possible. The question of overbracing and underbracing has been discussed from either point of view. It seems to be the opinion of the majority of physicians to apply more bracing wherever there is any doubt and remove parts as soon as it can be justified instead of adding braces where originally not enough support was provided. The psychological effect of removing parts is usually beneficial to the patient.

The concept of teamwork has been thoroughly established in the approach to physical disability. It is well established in prosthetics clinics all over the country but it is even more essential in the prescription and

