

The Cerebral Palsy Full Control Brace

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This article is based on the experiences of thousand of cases and of about fifteen years of creative research and designing developments.

It sounds rather simple when one says: "The Cerebral Palsy Full Control Brace." One would think that all that is necessary to accomplish full control of a Cerebral Palsy patient is to make and apply one of these braces, but this is further from the truth than any person can imagine.

The measuring of the Cerebral Palsy Control Brace is so vital to the outcome of the final results that it should be given comprehensive attention. Bear in mind that in this initial operation of building a brace, one is not only obtaining certain sizes but is creating a design and writing instructions for the production plant. I shall endeavor with illustrations and outline form to pass on to you the

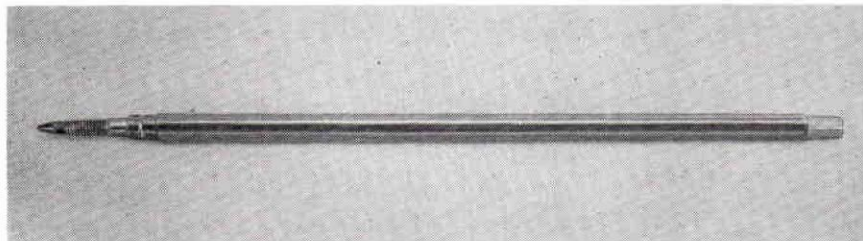


Fig. 1. Special Measuring Pen

How to measure for these braces, judge proper sizes of materials, build proper types of bearings and finally to develop the adjusting and fitting technique which is necessary to make the braces completely functional and comfortable are all problems that require infinite experience. It would be difficult to explain in writing the fitting technique and the multitude of small details which make these braces functional. This I believe could only be done in clinical classes where a particular problem in each case could be studied and worked out to a satisfactory solution. Therefore I shall limit this article to the measuring and the potential functions of the full control brace.

various techniques which I have found to make the measuring of cerebral palsy patients much easier with the possible exception of a very few cases.

Special Measuring Pen

In figure 1 you see a special measuring pen. The small diameter of this pen and its great length insure greater accuracy in tracing the leg. The ball pen rolls easily over the paper. All measurements should be in ink to prevent loss of instructions in the shop, due to smudging, and to reduce eye strain of the workers who are continually reading the measurements.

Tracing paper in figures 2 and 3 is taped to a piece of sheet brass.

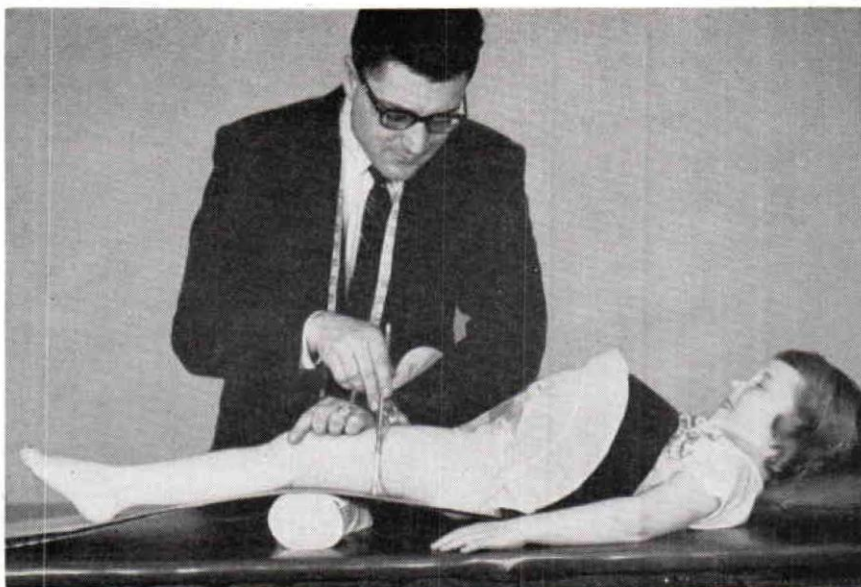


Fig. 2. Favorable Position for Measuring

Favorable Position for Measuring

In figure 2 you will see a very favorable position used in tracing the leg of a cerebral palsy patient. In this position most cases will be considerably relaxed. Relaxation and comfort of the patient should be vital considerations. Force is very seldom necessary.

Favorable Position and Method for Measuring Difficult Cases

In difficult cases it is wise to have assistance to hold the pelvis down and the foot in dorsal flexion. Place your own hand on the knee. (figure 3)

Sample Measurement

Figure 4 illustrates the final measurements. These results may be obtained as follows:

1. Never measure both legs unless there is a marked difference between the two. This reduces the time one must hold the patient and insures a pair of braces that look alike. If there is a slight difference in the circumferences, use the larger measurements.

2. Trace the leg, mark the joint locations and measure the calf and thigh circumferences as indicated in the figure. The lower thigh cuff circumference should be taken well down in the lower third of the thigh. Be sure and put the circumference measurements at the exact point where they are taken. When this is done take the patient off the paper, immediately.

3. Measure all lengths with the hip, knee and foot at right angles except the medial length from center of knee to top of thigh cuff. This measurement is taken with the leg straight.

4. Measure spinal uprights with patient on stomach with arms down by the sides. The proper distance to be measured is from the coccyx to the mid shoulder blades.

5. Pelvic circumference and caliper width is taken midway between the superior spines and the head of the trochanters.

6. Write all instructions, very clearly, on the same horizontal plane. This in combination with your ink drawing can reduce errors and increase efficiency in production and fitting.



Fig. 3. Favorable Position and Method for Measuring Difficult Cases

Full Control Brace

Before considering the possible functions of the full control brace, I would like to point out that full control does not mean that the braces function 100% in their operation of controlling the various motions, contractions and spastic conditions. Full control means that the braces are designed for application to the entire lower extremities and torso, and not just to the foot, knee or hip. Control can only be up to the point of tolerance and practical utility of the patient. With this in mind, I will outline for you all possible control functions of these braces. All of these functions are not utilized in each case.

The most essential element in the successful operation of the full control brace is the control of the feet which may require one or more of the following:

1. Equinus of the foot or forefoot
2. Valgus or Varus deformity
3. Dorsal flexion or Calcaneous foot
4. Abduction or Adduction of the forefoot, usually in conjunction with valgus or varus

5. Hammer toe
6. Hallux valgus

The various shanks, stops, T straps, big toe extensions, malleolus pads, etc., for obtaining these controls are well described in the "Orthopaedic Appliances Atlas," Volume 1, starting on page 522. There are several items which have been adapted since the printing of the Atlas, such as:

1. Double wedge soles and heels
2. Triple wedge soles and heels
3. Wedges and spreaders for toe control

It is quite obvious to the orthotist that the knee joint control takes care of medial, lateral, posterior and anterior support, but two quite common controls in this area which are not as obvious, are:

1. Subluxation below the knee joints. This is controlled by using a wide open calf cuff in conjunction with the knee cap.
2. Lateral bowing of the tibia. This is controlled by lateral padding at the calf and medial padding at the knee joint.

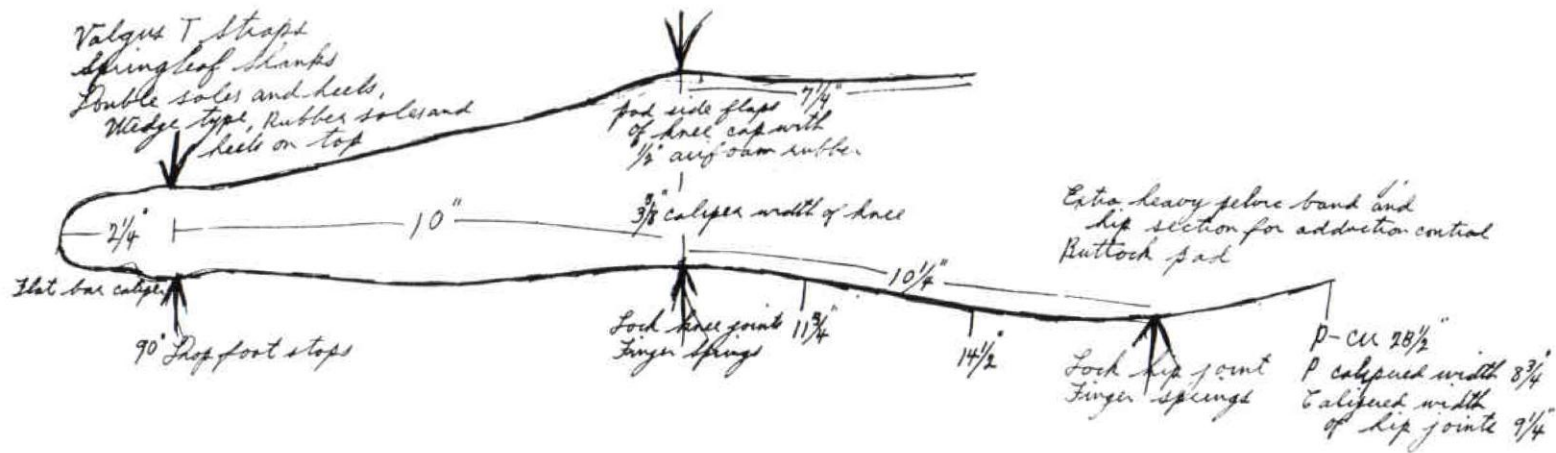


Fig. 4. Sample Measurement. C. P. Full Control Braces. Spring back Uprights 10". Harness
 type shoulder straps. General Instructions: The child has very powerful internal rotation
 and abduction. Set brace in abduction and supinate feet.



Fig. 5. Full Control Brace

Assuming that the feet and knees are in proper control, we may expect the following controls in the hip area:

1. Abduction
2. Adduction
3. Internal or external rotation
4. Radial reciprocation
5. Straight standing with the lock fastened

6. Limited walking motion with the loose fitting hip lock
7. Limited extension with the extension pin stop
8. Some degree of hip flexion control with the buttock pad. (See Fig. 916, Atlas.) However, the buttock pad is primarily used as a counter pressure for the contractions of the knees.

Assisting in some of the above functions are the spring back uprights which accomplish some of the following controls:

1. They stabilize a tilting of the pelvic band due to rotation strain on the hip bearings.
2. They force positive hip flexion to the rolling type of hip flexion.
3. They assist in standing and sitting posture, both laterally and posteriorly.
4. They act as a leverage in walking with the loose fitting lock and the limited motion extension stops.

With the above knowledge on measuring and certain functional controls, I believe an orthotist will have a good starting point in the bracing of cerebral palsy patients.

In the preceding paragraphs I have set forth, in brief, my ideas and opinions on a very complex subject. I hope that these thoughts will in some way help those who are faced with the problem of bracing cerebral palsy patients.

"WHAT'S NEW(S)"

Hersco Arch Products Corporation has introduced a new full length "Plantar Mould." Incorporated in this appliance are recessed indentations to accommodate the toes and any pressure points, such as plantar warts, individual metatarsal heads, soft corns, etc. This full length Plantar Mould reaches the forepart of the foot whereas the conventional

three-fourth length arch support does not.

The first procedure is to take foot prints, preferably full weight bearing. The growths callouses, bullae and warts should be definitely outlined on the foot prints. When ordering, it is suggested that the shoes as well as the impressions should be mailed. This makes for a most accurate fit.