

# Orthotic Philosophies of Treatment

by Wallace Motloch, C.O.\*

In situations when a medical condition places a physical limitation on a growing child, the orthotic treatment and devices are aimed at minimizing that limitation. Through the combined knowledge and skills of the orthotist, medical team, and family, as well as the child, the orthotic program maximizes that child's assets.

To illustrate how the various aids and braces work within the orthotic program, one can compare the developmental milestones of a child with normal body to that of a child with spina bifida (Figure 1). As the developmental need for sitting, crawling, and ambulating is encountered, an orthotic device is introduced to the spina bifida child who cannot accomplish these tasks well. Depending on the availability of funds and clinical resources, the orthotic care may start at infancy with the fabrication of devices for safe handling of the newborn, modifying equipment for play, bathing, and safe transportation. The orthotic involvement continues for the rest of that person's life as various braces for ambulation, support of the spine, contracture management, and general development of a lifestyle are designed and manufactured.

As the children progress from one developmental milestone to another and their needs change, so must orthotic devices. Often these needs overlap, calling for a "wardrobe" of devices (Figure 2). To illustrate this point let's imagine a person developmentally ready to crawl. To accomplish such exploration safely one will best be served by a wheeled device called a Caster Cart. While the Caster Cart is not a brace per se, it provides a vital part of the program by helping in a way that no brace or

wheelchair can. It allows the child to move around safely, positions him close to the floor, allows for retrieving playthings from the floor, and it aids in "hand-free" sitting.

Even though the Caster Cart has so many advantages, many parents are hesitant at this juncture, primarily because they imagine braces or some other bionic devices as restoring greater normalcy to their children. The orthotist must be very aware of the great pressure that drives the parents. They are desperate to do something! They are anxious to get the child into the best braces. They want to see the child up and ambulating. They want to see what it will be like—and that is the most normal behavior of any person. The orthotist must be compassionate at this point. He must know the dynamics of this situation. This is the most crucial moment in the parent-orthotist relationship; it will set the stage for many future meetings and achievements.

Having seen several hundred Spina Bifida children and their parents go through this stage, personally I believe that not one but three devices are in order: a Caster Cart, Standing Brace (It should be pointed out here that the name "Standing Brace" is a misnomer as the device facilitates much more than standing), and Parallel Walker. The reason that this combination works the best is that crawling is very quickly followed by standing and ambulation. Oftentimes these are not demarcated clearly, and as the functions are accomplished, the devices continue to be used in an overlapping fashion—so why not have all three at once and let the child dictate the progress. While the actual design of braces can vary at this stage, as long as the child is upright safely and can stand "hand-free," the purpose is achieved.

As the child gets older (two to three years), another crucial bracing decision has to be made.

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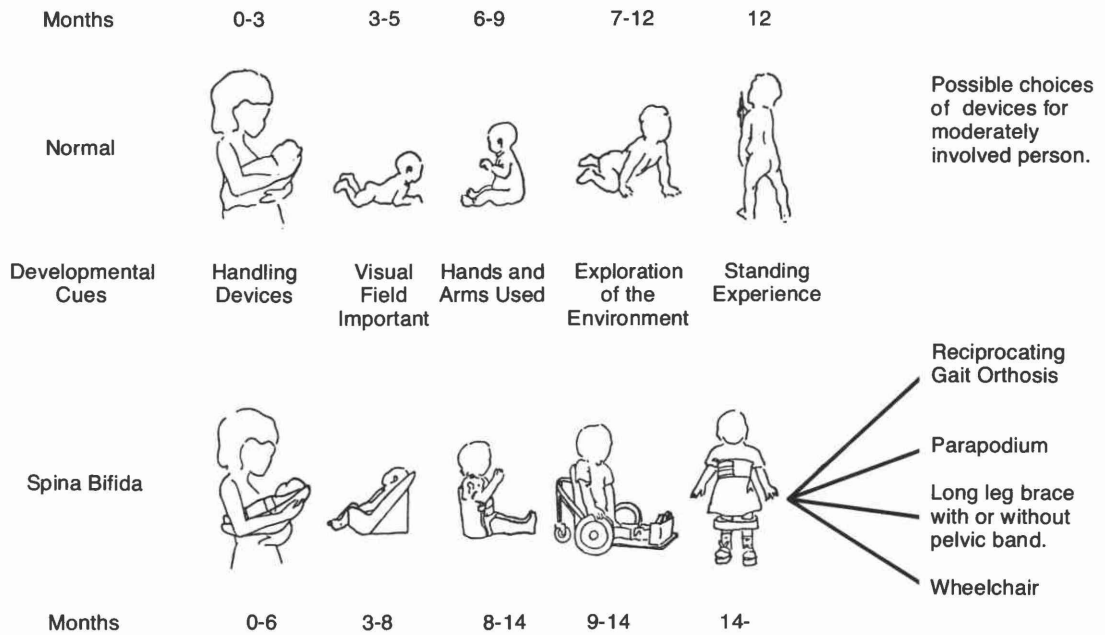


Figure 1. Comparison of the developmental milestones of a normal child to a spina bifida child.

It has to be decided if the child is capable of ambulating with a reciprocal gait (one leg in front of the other) or whether he/she must ambulate by swing-to, swing-thru, or pivoting. It has been my experience that whenever possible the Reciprocal Gait Brace (Dual cable type) should be considered, as it has particular importance for the Spina Bifida person. The Reciprocating Gait Brace (RGB) is a dynamic orthosis unlike any conventional device made. It provides:

**Standing Balance and Support:** Wearers can have their hands free for activities of function while standing.

**Automatic Hip Joint Locking:** This provides for ease of locking the brace with hands on crutches or walkers.

**Efficient Ambulation:** Compared to conventional orthosis, RGB was tested (distance walked with same increase in heart rate) to be two to three times more efficient. This saves energy for people with muscle weakness, and for people likely to gain weight, it encourages more physical activity.

**Dynamic Hip Reciprocating:** The special hip mechanism couples the hip joint motion so that flexing of one side causes forced extension of the opposite side (a mechanical hip extensor). This function facilitates walking, but in people prone to hip flexion contractures it also stretches the hip contractures with every step.

Around the age of ten another crucial decision comes up: the use of the wheelchair. There are many reasons for this. A few are: lack of physical strength for ambulation, cosmetic appearance and peer pressure, ease of assistance from others and general convenience of getting around. Many people with Spina Bifida find that ambulation in braces becomes quite energy consuming and that in the school setting in particular, it makes the carrying of books inconvenient. Many slowly, but surely, drift to greater use of the wheelchair. They find that their shorter stature in braces doesn't serve them as well as the sitting posture in a wheelchair. Also, it is harder for them to get help from others now that they are bigger and heavier. When need for assistance arises, say to go up ten steps, it is



Figure 2. Wardrobe of devices for a child who is ready to stand and ambulate (brace and walker). At the same time, the child retains a Caster Cart for exploration and Body Jacket for support of collapsing spine.

harder to help a brace wearer than a wheelchair rider. In any case, because many people choose a wheelchair in addition to, or instead of, braces, the orthotist stays involved in design and fabrication of special pressure sore prevention aids like contoured seat cushions and Suspension Body Jackets.

Unfortunately, for many spinal cord injured teenagers and adults we do not have braces that can compete effectively with the wheelchair's efficiency and convenience. As things are, while there are a fair number of devices to choose from for the under-ten-years-old group, the choice is very limited for the older group. Much more ingenuity and research is needed to develop designs that will prove useful to the latter group.

## REFERENCES

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