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Low Profile Contoured Ring

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The design of the Milwaukee Orthosis has changed considerably since its introduction in 1945.[1] Continued development has led to decreased use of the traditional Milwaukee Orthosis in the treatment of idiopathic scoliosis. In many locales, the low profile T.L.S.O. (thoracic lumbar sacral orthosis) dominates the non-operative treatment of scoliosis because of better patient acceptance and its effectiveness in managing mid-thoracic and lumbar curves. We utilize a T.L.S.O. module on a routine basis when the apical vertebra is at the ninth thoracic vertebra or below. We have also used a T.L.S.O. on borderline mid-thoracic curves with the understanding that the orthosis may need to be modified to the C.T.L.S.O. (cervical thoracic lumbar sacral orthosis) design if we fail to control the curve. Recently we have modified the neck ring of our C.T.L.S.O. to make it less conspicuous and, therefore, gain better patient acceptance without sacrificing effectiveness. (Figure 1).

The development of this new neck ring resulted from an outgrowth of work conducted at The Children's Hospital at Stanford University.[2] The Hospital staff had modified the Fillauer throat frame for use in a biofeedback program for the treatment of scoliosis. This stimulated our interest in

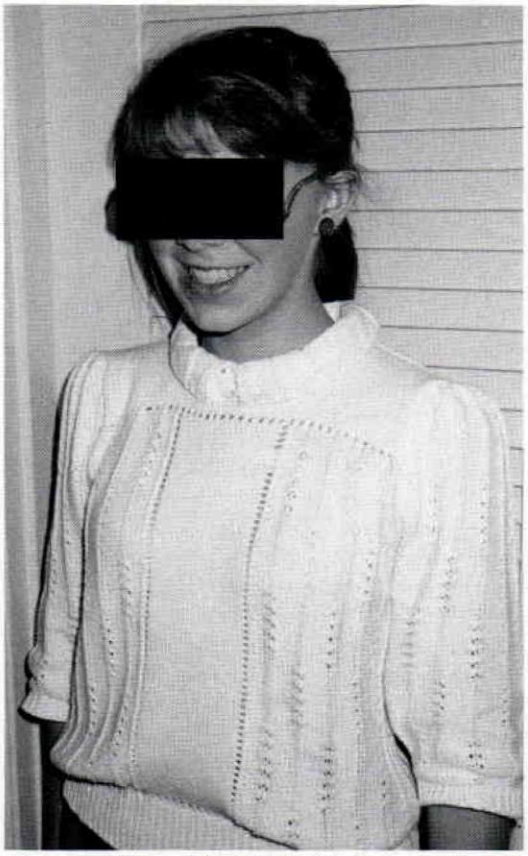

Figure 1. The modified C.T.L.S.O. is more effective and less conspicuous.

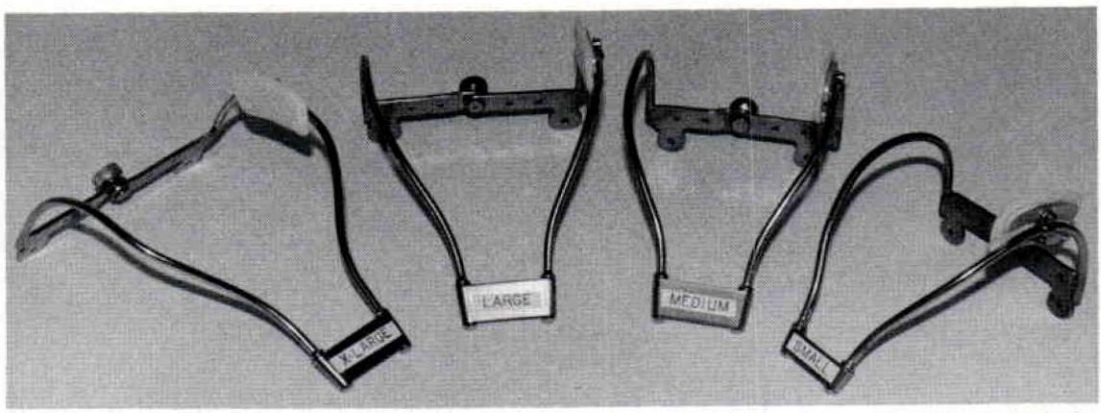

Figure 2. There are four standard ring sizes—small, medium, large, and extra large—that differ in both the antero-posterior and medio-lateral dimension.

modification of the neck ring to effect a more cosmetically acceptable device. In 1981 we began fitting patients with this type of neck ring, and soon realized that our patients accepted this design more than the conventional neck ring. This was most apparent in the children who had initially used the conventional neck ring. Eliminating the mandibular and occipital sections also improved comfort.

Traditionally, the neck ring provided three functions. A distraction force was applied to the spine as a result of the occipital and mandibular pads. It provided a lateral counter pressure, and it functioned to center the head and neck over the trunk. It is our impression that the latter two functions are the most important and are maintained in the new design.

Distraction played a prominent role in the early Milwaukee orthoses. Such extreme measures were shown to have a deleterious effect on the jaw and teeth, and the use of the mandibular pad was eliminated in the 1960's. It has been stated that the occipital pads in the absence of a high mandibular pad serve as a fulcrum about which the patient can obtain distraction by hyperextending the cervical spine. We are now reevaluating this accepted theory in

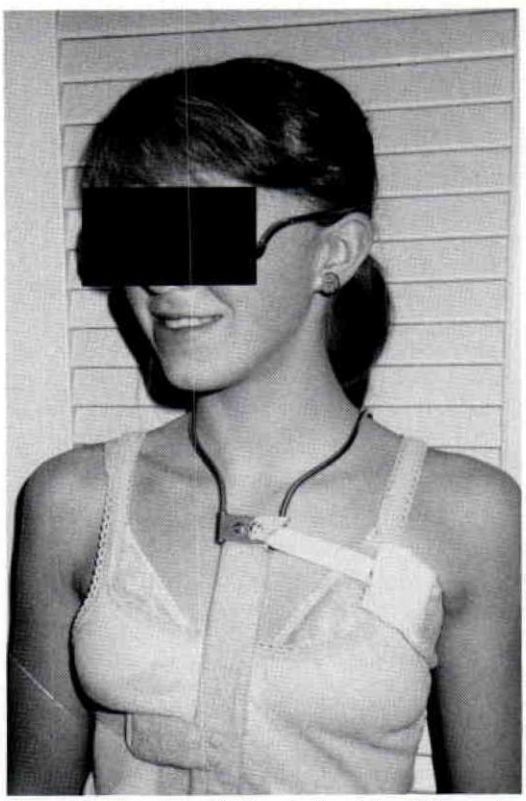

Figure 3. The ring will touch the side of the neck, but it is possible to reduce excessive pressure on the neck by adding a three-quarter ring.

light of the success the low profile ring is achieving. In practice, it seems that the patient does not utilize this function of the ring, and our feeling is that it is of little benefit to provide provisions in a ring to achieve this function.

Paramount in this new concept is the realization that with the cosmetically acceptable low profile neck ring, the problems associated with compliance are removed, while desirable effects from using a neck ring are preserved. The Low Profile Neck Ring provides a lateral control force to act in concert with an axillary sling to oppose the thoracic pad. The ring also positions the head over the pelvis to result in a compensated spine.

RING SELECTION AND FITTING

There are four standard ring sizes—small, medium, large, and extra large—that differ both in the antero-posterior and medio-lateral dimension (Figure 2). It is very important to carefully select the proper size in order to achieve maximum cosmesis. The ring should fit around the base of the neck without impinging on the clavicle. As in the other designs, the ring will touch on one side of the neck. It is possible to reduce excessive pressure on the neck by adding a three quarter axillary ring (Figure 3). The axillary ring will often make orthosis use more comfortable.

A disadvantage to the use of the Low Profile Contoured Ring is the added time required in fitting as compared to the more traditional designs, because of the emphasis placed on achieving maximum cosmesis. What used to be acceptable parameters for a properly fitted ring have now changed, and close attention must be paid to determine the proper height of the ring. Observing the patient both in the standing and the sitting position is mandatory, since there may be a considerable difference in height measurement. Adjusting the various pads frequently lessens this difference. The ideal situation is achieved when the algebraic sum of the pressure of the right and left pressure pads is equal. This is obviously a subjective judgment, for there are no means of accurately measuring the pressure on each pad. However, keeping this concept in mind will aid in achieving optimum orthotic function.

SUMMARY

The authors have fit 50 patients with orthoses incorporating the Low Profile Contoured Ring. The overall results appear to be excellent, and the ring is continuing to be used in place of previously used designs. The authors have further modified the concept by lowering the lateral placement of the ring from mid-neck to the base of the neck, which does not compromise the effectiveness of the orthosis. The inch lost in length is functionally insignificant, but is cosmetically important. With the placement of the ring at the base of the neck, it is unobtrusive when wearing clothes. At present, orthopedic surgeons, orthotists, and especially patients are very optimistic about this new design. A protocol for its usage and fitting requirements is being written.

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