

## MODIFICATIONS OF A MACLAREN BUGGY MAJOR FOR ORTHOPAEDIC SEAT INSERTS

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The MacLaren Buggy Major<sup>2</sup> has been used for some time now at the Rehabilitation Engineering Center of Children's Hospital at Stanford. It offers an attractive, lightweight, folding stroller base to which an individually fitted orthopedic seat insert can be attached (Figs. 1, 2, 3, 4).



Fig. 1. The MacLaren Buggy Major base in upright position.

The main disadvantage that we have found is that when the stroller is open for use its seat is fixed in 90 deg. of hip flexion and the seat-back is reclined 60 deg. above the horizontal, thus offering no freedom for variation.

Most of the children seen here need at least two positions of reclination in order to maximize hand control, and for resting. Pictured in Figures 3 and 4 is a twelve-year old boy with cerebral palsy with tension athetosis, who requires positioning at 90 deg. above the horizontal for hand function and school activities, and positioning at 70 deg. above the horizontal for feeding and resting.

The two position feature was provided by shearing off the aluminum rod cap and re-

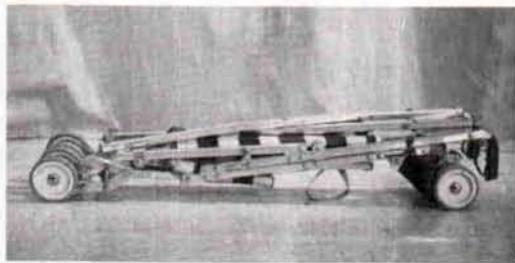


Fig. 2. The MacLaren Buggy Major base in folded position.



Fig. 3. The MacLaren Buggy Major and patient in orthopedic seat insert in upright position.



Fig. 4. The MacLaren Buggy Major and patient in orthopedic seat insert in reclined position.

moving the "U"-bracket and aluminum rod (Fig. 5) from the seat bottom and filling the holes formerly occupied by the rod with two pop-rivets so as to reattach the remaining bracket on the seat bottom, as shown in Figure 6. The seat bottom is now free to be positioned in any degree of hip flexion, or, as in this case, be folded flat against the seat back (Figs. 3 and 4). Attachment of the seating insert is made possible by the aluminum bracket shown in Figure 7.

The seat insert is made of half-inch thick ash plywood. It is padded to meet the therapeutic requirements of each patient. A steel rod bolted through the lower back, also shown in Figure 7, serves as the point of articulation. A cold-rolled square steel tube is used for the upper strut, which fixes the angles of reclination. Pivoted on the insert, the tube is notched where it crosses the aluminum arm of the Buggy at the required angles of reclination and is held in place by Velcro straps.

Footrests for this application must be adjustable to two positions to complement the two-position insert. It is constructed of half-

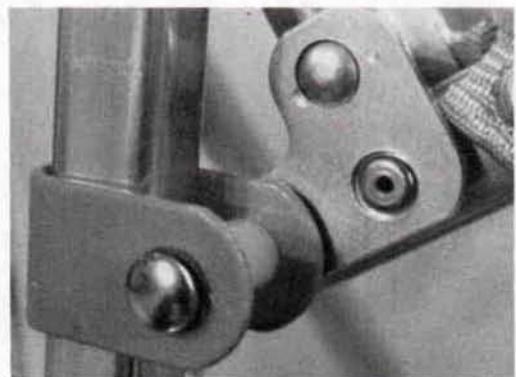


Fig. 5. "U"-bracket and aluminum rod that are removed to allow use of the orthopedic seat insert.

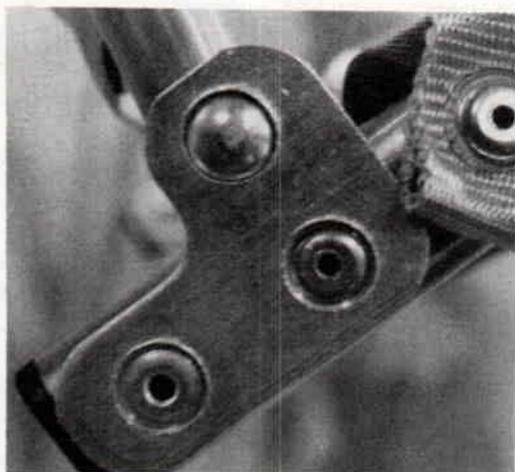


Fig. 6. The remaining bracket is reattached to the seat bottom with pop-rivets.

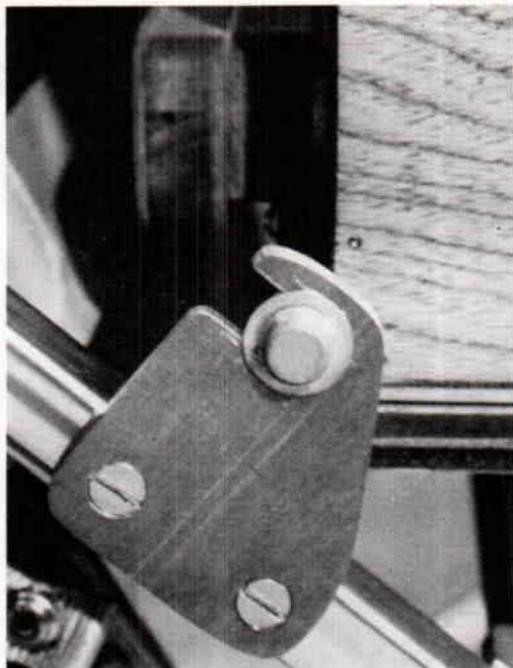


Fig. 7. Aluminum bracket used to provide attachment of seat insert.



Fig. 8. View showing floor base to receive the orthopedic seat insert.

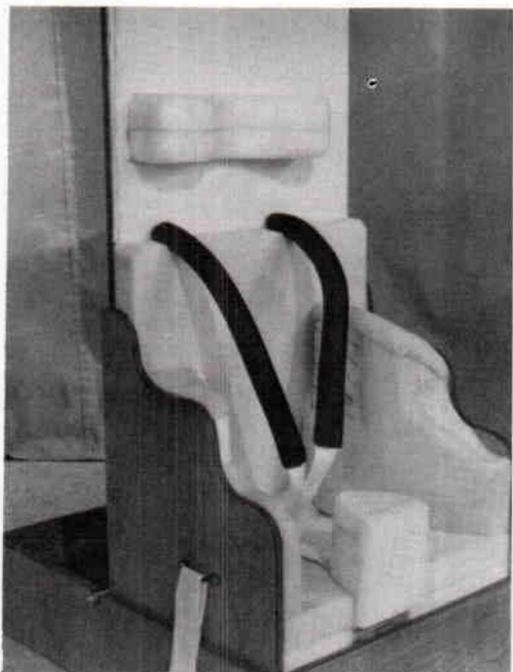


Fig. 9. Another view of the orthopedic seat insert and floor base.



Fig. 10. View of the system incorporating a Lexan tray.



Fig. 11. Another view of the system incorporating a Lexan tray.

inch ash plywood also, and is hung over the lower front aluminum cross member. It is removable. The main foot rest is fitted when the chair is in its more upright position. To accommodate the reclined position, a hinged piece of plywood with Ethylfoam of a thickness to achieve proper foot support is constructed, as shown in Figures 3 and 4.

To allow the child to participate in floor activities, a floor base is constructed to receive the insert. This base places the child at the proper height for his legs and is constructed strong enough to withstand the child's contractures (Figs. 8 and 9).

Most children require trays. These can be attached either directly to the seat insert or to the Buggy itself. While no tray has been constructed for the child shown here, Figures 10 and 11 show two units constructed at this center for other children. The trays can be constructed of ash plywood and sealed, or of polycarbonate (Lexan). Lexan, although more expensive, is preferred for durability, cleanliness, and the transparency that permits the child to look through the tray, thereby not blocking part of his world from view.

In all of the modifications made to the MacLaren Buggy and the devices which are attached to it, the original themes must remain. The Buggy and orthopedic seat system must be attractive, as lightweight as practical, and still allow the Buggy to fold flat.

#### Footnotes

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<sup>2</sup>MacLaren Buggy Major made in England by Andrew MacLaren, Ltd., Barby nr Rugby, England. Imported into the U.S. and distributed by MED-Medical and Hospital Equipment, 1215 S. Harlem, Forest Park, Ill. 60130; and Robin Aids, 3353 Broadway, Vallejo, California 94590.