

## REPORT PANEL ON SPINAL ORTHOTICS

Chairman: Allen S. Edmonson  
 Recorder: Charles Dankmeyer, Jr.  
 Members: Martin Buckner      James Morris  
               Frank Coombs         Don Vargo  
               John Glancy             Hugh Watts  
               Marion Miller

Since the area for discussion was quite large, we chose to eliminate from consideration "total-body" orthoses or those which incorporated limb orthoses with trunk orthoses. Spinal orthoses were then considered from two aspects, purpose and anatomical area of application. Purpose was subdivided into general immobilization and special purpose. Orthoses for special purpose were corrective, preventive, and assistive and included devices for patients with scoliosis, kyphosis, and neuromuscular disorders with and without sensory deficit. Because orthoses for myelomeningocele frequently encompass both the torso and the lower limbs, this category was discussed only briefly.

The classification system used along with some comments is shown in Tables 1 and 2.

**TABLE 1**  
SPINAL ORTHOSES FOR GENERAL IMMOBILIZATION

<u>CERVICAL</u>	<u>DEVICE</u>	<u>FUNCTION</u>	<u>COMMENTS</u>	<u>NEED</u>
Minimum Immobilization	Soft sponge collar Plastic adjustable collar	Limits flexion, extension or both	Generally comfortable	
Moderate Immobilization	Four-poster SOMI Molded collar (Philadelphia) Halo-Jacket	Limits flexion, extension and rotation	Some discomfort because it can be removed by patient.	Design to free mandible
Maximum Immobilization	Halo-Cast	Approaches immobilization in all planes including distraction	Requires skull pins	Fixation to head without skull pins

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<u>CERVICAL</u>	<u>DEVICE</u>	<u>FUNCTION</u>	<u>COMMENTS</u>	<u>NEED</u>
<u>UPPER THORACIC</u>				
T-1 — T-7				
Minimum	None		Difficult area	
Moderate	Occiput and mandibular attachment to lower spine orthosis	Fixes head to torso	Not comfortable Can be removed	Better head fixation
Maximum	Halo-Cast	Fixes head to torso	Comfortable and can't be removed. Can distract	Head fixation without skull penetration
<u>LOWER THORACIC</u>				
(T-8 — 12) and Thoraco-Lumbar				
Minimum	Thoraco-Lumbar Corset	General immobilization	Shoulder straps or anterior pads are not comfortable	Improved design and fabrics
Moderate	Jewett	Limits flexion	Sternal & lower abdominal pressure	Design to unload or distract
	Long Taylor	Limits flexion and extension	Shoulder straps	
Maximum	Halo-Cast	Near "immobilization"	Pins in skull not removable	Distraction without halo pins
<u>LUMBAR AND LUMBO-SACRAL</u>				
Minimum	Lumbar corsets	Limits all planes of motion	Reasonably comfortable	Better design and fabric
Moderate	Williams type	Holds lumbar spine flexed	Adequate	
	Knight or Chair-back type	Limits all range of motion	Adequate	
	Custom molded rigid plastic jacket (UCB type)	Limits all range of motion	Most efficient and utilizes abdominal pressure	Designed to wear at work
	VAPC Orthosis	Limits all range of motion and attempts distraction	Comfort is problem	Better patient tolerance

**TABLE 2**  
**SPINAL ORTHOSES FOR SPECIAL PURPOSES**

SCOLIOSIS

<u>DEVICE</u>	<u>FUNCTION</u>	<u>COMMENTS</u>	<u>NEED</u>
Milwaukee Brace (CTL SO)	Halt progression of curves in all anatomical areas	Permanent correction not routine	(1) Permanent correction device
Underarm Brace (TL SO) Boston, Pasadena, Wilmington & Italy	Treatment curves thoraco-lumbar and lumbar	Long term results not established	(2) Improve rib hump and lordosis
Kalabus-Harness	Control infantile curves	Efficiency questionable	

KYPHOSIS ADOLESCENT

Milwaukee Brace (CTL SO)	Can produce efficient corrective tone	Treatment for structural and flexible curves Believed to produce permanent correction	Design to eliminate neck ring
Anti-gravity type (TL SO) (Pelvic flexion girdle + / — anterior outrigger)	Suggested for flexible curves Flattens lumbar lordosis Thoracic kyphosis expected to follow	"Postural correction"	More comfort

KYPHOSIS ADULT

Jewett Long Taylor Molded Body Jacket Thoracolumbar corset	Support and resist flexion	Most are poorly tolerated by elderly Don't unload spine	Design and materials improved for comfort
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NEUROMUSCULAR DISORDER WITHOUT SENSORY DEFICIT

CTL SO with molded plastic girdle	Support and prevent collapse	Milwaukee type neck ring is problem	Design to minimize abdominal restriction
TL SO Molded plastic body jacket	Support and prevent collapse	Moderately efficient	Design to minimize abdominal restriction
Corsets	Support and prevent collapse	Less efficient Restricts abdomen	Design to minimize abdominal restriction
Custom molded chair inserts	Support and prevent collapse	Used for most-severely involved patients	Improved design

NEUROMUSCULAR DISORDER WITH SENSORY DEFICIT

All above can be used for short periods of time only	Support and prevent collapse	Practical application very limited	New designs & materials to allow pressure and support without skin damage
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**RECOMMENDATIONS**  
(IN ORDER OF PRIORITY  
WITHIN EACH SECTION)

**A. GENERAL**

1. Evaluation and analysis of basic spinal orthoses both those presently used and those in experimental study are needed so that prescription and application can be done more nationally. A method of evaluation using objective engineering principles should be developed first, however.
2. Summary and review articles compiled from orthopaedic journals and texts in orthotic and prosthetic publications should be carried in the journals as appropriate to allow each half of the team to read more efficiently in the other's area of expertise.
3. Promotion of the "image" of the orthotist and the patient wearing an orthosis should be supported.

**B. ORTHOSES FOR GENERAL  
IMMOBILIZATION**

1. A method to "unload" or distract the spine and immobilize the head without skull pins should be developed. Mandible and anterior neck should be free.
2. A new orthosis for immobilization of the upper thoracic spine, (T-1 — T-8) should be developed.
3. Development of a semi-flexible lumbar support probably of molded plastic is needed.
4. A better method of orthotic fixation of the pelvis should be developed for lumbo-sacral orthoses.
5. Corset supports should be redesigned to be more comfortable, more stable, more easily applied, more easily adjusted, and constructed of better fabrics.

**C. ORTHOSES: SCOLIOSIS AND  
KYPHOSIS**

1. Development of an orthosis to *correct* preferably without a neck ring.
2. An organization of orthotists interested in scoliosis should be formed to work with the Scoliosis Research Society.
3. Design improvement is needed for upper thoracic and cervical curves in scoliosis and improvement in treatment of rib deformity and rotation.
4. A better orthosis for the elderly kyphotic with pain is needed.
5. The education of orthotists should include x-ray evaluation of spinal deformities using standardized positioning of the patient.
6. Improved cosmesis is needed in orthotics for adolescents for treatment of scoliosis and kyphosis.
7. An improved orthosis for scoliosis in infants should be developed.
8. Specialized local treatment center for scoliosis and kyphosis should be established.
9. Designs in orthoses for scoliosis and kyphosis should be more adjustable in the clinic to provide a wider range of fitting possibilities.

**D. ORTHOSES FOR NEURO-MUSCULAR  
DISORDERS**

1. Improved materials and design for orthoses that allow use on patients with sensory deficit are needed.
2. Development of a "dynamic" orthosis which utilizes external forces to provide both support and assistance should be initiated.
3. There should be a coordination of educational efforts in the field of genitourinary surgery and general surgery with orthotic advances to accomplish more optimal placement of urinary "ostomies."

#### E. DELIVERY OF NEW DEVICES AND SERVICES

With the demise of the Committee on Prosthetics Research and Development, there is at present no organization to coordinate, evaluate and disseminate information on new devices and services. An organization to meet this need is imperative. It is needed to work with the educational system so that prosthetists, orthotists, physicians, therapists and other interested persons can become familiar with worthy devices and services in order that they be delivered properly to the public. Unrealistic regulations and inadequate fee schedules are a barrier to delivery of new devices and services. Education of governmental agencies and other "third-party" organizations should be the best means to achieve modification.

#### F. WHO SHOULD PROVIDE SPINAL CORSETS?

This special charge was considered at length. It was pointed out that some corsets are custom fitted and others are not. Presumably one important factor involved in provision of "unfitted" or "off-the-shelf" corsets is economy of time and /or money. There was unanimous agreement that all "fitted" corsets should be provided by an orthotic facility. If no fitting was desired by the purchaser, agreement was not unanimous but strongly in favor of supply by an orthotic facility. Most agreed that fitting a corset was "best patient care."