The New York University Approach To Spinal Orthotics

By Grace Jackson and Warren P. Springer[1]

A major advance in the field of spinal orthotics took place in January of this year when New York University's Post-Graduate Medical School offered its first course in "Spinal Orthotics for Orthotists." The culmination of two years' intensive planning by a team of specialists from various disciplines, the new course imposes a logical, coherent system upon the theory and practice of spinal bracing. According to Sidney Fishman, Ph.D., Coordinator of Prosthetics and Orthotics, "Education in spinal orthotics is finally coming of age, and can now begin to take its place alongside lower-extremity prosthetics and lower-extremity bracing as an ordered field of knowledge."

Actually, as Carlton Fillauer, a member of the planning group, pointed out, "Spinal bracing has been an uncharted area." As a result, the number of spinal braces has been proliferating to such an extent over the years that today an orthotist is confronted by more than thirty, each bearing a different name and often providing only insignificant functional variations. Efforts had been made from time to time to catalogue this multiplicity of spinal devices and to provide a rationale for each. But no concerted inquiry into the essential functions of spinal orthoses had been attempted until the present project got under way.

The Planning Committee

In December 1965, NYU's Post-Graduate Medical School invited a selected group of specialists in orthotics and related fields to meet together in order to develop a solid foundation upon which to base the design, fabrication, and teaching of spinal braces. The situation confronting the planning committee was analogous to that prevailing in lower-extremity prosthetics back in the early 1950s. At that time prosthetists were also

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offered a number of devices and components under a variety of trade names, which they made use of on a largely empirical basis. Before formal courses in lower-extremity prosthetics could be offered at NYU and other centers, similar groups had to analyze and systematize the field. As a result of their efforts, three new approaches were introduced into the fabrication of lower-extremity prostheses. First, the components were classified in terms of their basic construction and function. Second, a biomechanical rationale was offered for the shape and alignment of each prosthetic component. Finally, measuring procedures were systematized so that prosthetists used essentially the same anatomic landmarks when fitting and fabricating prostheses. The need for a similar process in spinal orthotics became immediately apparent.

The NYU Spinal Orthotics Planning Committee met eleven times over a two-year period, usually for three days at a time. They "argued over details that no one had ever discussed before," according to Mr. Fillauer, "and let fresh air into the field of spinal orthotics for the first time." Although a similar functional approach to lower-extremity bracing had been worked out successfully four years before, the great complexity of the spine made the committee's task that much more demanding.

The members of the Spinal Orthotics Committee were Norman Berger, NYU Post-Graduate Medical School, chairman; John Glancy, formerly of Children's Hospital Medical Center, Boston, and presently with the Department of Orthopedics, Indiana University School of Medicine; Carlton Fillauer, of Fillauer Surgical Supplies, Chattanooga; Charles Rosenquist and Robert Fannin, of Columbus Orthopaedic Appliance Company, Columbus, Ohio; Ivan Dillee, Joan Edelstein, Clauson England, Jeanne Sementini, Warren Springer, and Hans R. Lehneis, of NYU.

The Basic Braces

After consultations with orthopedic physicians and intensive discussion among themselves, the committee arrived at new criteria for classifying spinal braces. First, the thirty-odd presently available spinal braces were reduced to seven basic braces, each of which provides significantly different functions. Second, measuring and tracing techniques were related to surface anatomy, so that each orthotist can now measure his patients in a standardized manner. Finally, uniform fitting techniques were devised, based upon anatomic landmarks and biomechanical principles.

Since a primary purpose of a spinal brace is to restrict motion, the braces were named on the basis of the motions the brace controls and the level of control, as follows:

1. Lumbosacral Anteroposterior Control Brace.
2. Lumbosacral Anteroposterior and Mediolateral Control Brace.
3. Lumbosacral Posterior and Mediolateral Control Brace.
4. Thoracolumbar Anterior Control Brace.

5. Thoracolumbar Anteroposterior Control Brace.
6. Thoracolumbar Anteroposterior and Mediolateral Control Brace.
7. Thoracolumbar Anteroposterior, Mediolateral, and Rotary Control Brace.

From among these basic functional braces, the physician can now select the one that best controls the particular spinal motions he wishes to have controlled, such as anteroposterior or mediolateral motions of the upper or lower spine. In addition to motion control, another primary purpose of spinal braces is to increase intraabdominal pressure. The committee, therefore, spent considerable time discussing and designing the abdominal support (corset or apron) to be used on these braces.

The First Spinal Bracing Course

Once these functional criteria had been agreed upon, it became necessary for the NYU faculty to develop new text materials and an appropriate curriculum. (See course schedule.) The new techniques and materials were introduced into NYU's four-year prosthetics and orthotics undergraduate curriculum in 1967. After further refinements had been made, NYU offered the first postgraduate course in "Spinal Orthotics for Orthotists" from January 22 to February 2, 1968.

The didactic instruction included seven hours of anatomy, five hours of pathology and related medical information, fifteen hours of brace fitting and fabrication, and two and one-half hours of corsetry. The remainder of the class time was devoted to the actual fitting and fabrication of the basic braces and their modifications by the students themselves on a variety of patients (*Figure 1-5*). Each fabrication period was followed by a critique, in which faculty members analyzed in detail each brace and corset fabricated or fitted by a student (*Figure 6-7*). In addition, one day was devoted to the fitting and fabrication of cervical appliances, and one half day to a demonstration and discussion of the Milwaukee brace.

Reactions of Faculty and Students

According to John Glancy, the new approach "has imposed discipline upon a previously chaotic situation. A good deal of dross has finally been dropped from the field of spinal orthotics." He pointed out that "bringing things down to basic principles will help the orthotist to reach a better understanding of the prescriptions he'll receive from physicians in the future. . . . A Pandora's box was opened when the committee began investigating the field of spinal orthotics two years ago. What's left makes sense on the basis of function."

Mr. Fillauer said, "For the first time students are being presented with an orderly arrangement of basic styles of spinal bracing, organized in such a way that the material can be immediately put into practical use." He stressed the importance of the course's emphasis on fitting and fabrication:

"Seeing, feeling, and hearing about what you've actually done yourself is much more valuable than merely listening to a lecture. Also, everybody learns by seeing others' mistakes." Mr. Fillauer believes that the new approach has "simplified the field so that students can go home with confidence, ready to apply what they have learned." He emphasized how great the need has been for organization in spinal orthotics. Approximately 20 percent of an orthotist's patients require spinal bracing, yet until now fitting has been "an empirical process, in which neither the orthotist nor the physician, in many cases, is able to justify his reason for prescribing a particular brace. Here, in the new course, reasons have to be given."

The faculty member who coordinated the course, Clauson England, said, "Viewing the course from a teaching standpoint, I was pleased by the students' acceptance of the rationale and the techniques presented." He also expressed gratification at "the feedback from the students. They felt the course offered useful and workable advances in the field of spinal orthotics, and was a valuable contribution to all concerned in the treatment of spinal problems." In addition, Mr. England pointed out, "All the students liked the basic terminology and the concept of relating braces to functions."

The ten orthotists who attended the first course came from eight cities in the United States and one in South Australia. Their comments at the close of the two-week curriculum clearly supported the views of the faculty. George Estrin, of the Veterans Administration Hospital in the Bronx, New York, approved of the fact that there was "no egghead theory in the course." Instead, he said, he'd found it extremely practical. "Everything taught can be put into immediate use as needed, and none of the new concepts or techniques require new equipment or materials." He also said the anatomy lectures were clearer than any he'd had before, but he was pleased that actual brace-making, not anatomy, received the major emphasis.

Michael Di Pompo, an orthotist with the Veterans Administration Prosthetic Center in New York City, said that he planned to turn the written materials from the course over to his facility, where they would be incorporated into their own training program.

John A. Roberts, a Philadelphia orthotist, expressed appreciation for the fact that the course emphasized how to *fit* orthoses, rather than how to prescribe them, which can lead to needless disagreements with the prescribing physician.

The orthotist from South Australia, Frank Simson, who is in New York on a Winston Churchill Fellowship, applauded the logical approach of the course. "For the first time," he said, "names are not emphasized, but instead we concentrate on the function of a particular brace."

Harold W. Smith, of Children's Hospital in Boston, agreed with this viewpoint. "Why call a brace by a proper name," he asked, "rather than

by a specific function?" He felt the course instruction had been helpful not only in introducing new principles, but in serving as a refresher course as well.

Future Plans

As a result of the unqualified success of the first offering, New York University will continue to offer spinal orthotics for orthotists on a regularly scheduled basis. In addition, work is being completed on a corresponding course for physicians and surgeons to be inaugurated in the Fall of 1968. This will result in comprehensive instruction in this field being available to the two groups most intimately concerned — physicians-surgeons and orthotists.

As a result of the experience of developing and teaching this course, it appears abundantly clear that the great majority of individuals engaged in spinal orthotics will experience direct, tangible improvement in their fitting activities through attendance in these courses.

Course No. 756A: Spinal Orthotics for Orthotists
First Week

Date	Hour	Subject	Instructor
Monday	8:30- 9:00	Registration and Orientation	Mr. England
	9:00-12:00	Anatomy: Skeletal and Surface	Mrs. Edelstein
	1:00- 2:00	Functions of Spinal Orthoses	Mr. Springer
	2:00- 3:00	Basic Components of Spinal Orthoses	Mr. England
	3:00- 4:30	Lumbosacral Corsets	Mr. Fannin
Tuesday	9:00-11:00	Anatomy: Joints and Their Functions	Mrs. Edelstein
	11:00-12:00	Measurements and Tracings for the Lumbosacral A-P and M-L Control Brace	Mr. England
	1:00- 2:15	Measurements and Tracings for the Lumbosacral A-P and M-L Control Brace (lab-each student measures and traces two patients)	Faculty
	2:15- 3:00	Measurement and Tracing Critique	Faculty
	3:00- 5:00	Fabrication of the Lumbosacral A-P Control Brace with Full Front Abdominal Support (lec and lab)	Mr. England & Faculty

Date	Hour	Subject	Instructor
Wednesday	9:00-11:00	Fabrication of the Lumbosacral A-P Control Brace with Full Front Abdominal Support (lec and lab, continued)	Mr. England & Faculty
	11:00-12:30	Critique	Faculty
	1:30- 4:00	Correction of A-P Control Brace and Conversion to A-P and M-L Control Brace with Corset Front (lec and lab)	Mr. Fillauer & Faculty
	4:00- 5:00	Critique	Faculty
Thursday	9:00-11:00	Anatomy: Muscles and Nerves	Mrs. Edelstein
	11:00-12:00	Measurements and Tracings for the Lumbosacral P and M-L Control Brace	Mr. Fannin
	1:00- 2:00	Measurements and Tracings for the Lumbosacral P and M-L Control Brace (lab)	Faculty
	2:00- 3:00	Preparation of Pelvic and Thoracic Bands and Lateral Bars (lab)	Faculty
	3:00- 4:30	Completion of P and M-L Control Brace	Mr. England
Friday	9:00-11:00	Completion of P and M-L Control Brace (lab)	Faculty
	11:00-11:30	Fitting of P and M-L Control Brace	Mr. Fannin
	11:30-12:30	Fitting of P and M-L Control Brace (lab)	Faculty
	1:30- 3:00	Critique	Faculty
	3:00- 4:00	Thoracolumbar Corsets	Mr. Fannin
Second Week			
Monday	9:00-11:00	Pathologies of the Trunk Requiring Bracing	Mrs. Edelstein
	11:00-12:00	Measurements and Tracings for the Thoracolumbar A-P Control Brace	Mr. England
	1:00- 2:00	Measurements and Tracings for the Thoracolumbar A-P Control Brace (lab)	Faculty

Date	Hour	Subject	Instructor
	2:00- 2:30	Fabrication of the Thoraco-lumbar A-P Control Brace	Mr. England
	2:30- 4:30	Fabrication of the Thoraco-lumbar A-P Control Brace (lab)	Faculty
	4:30- 5:00	Fitting of the Thoracolumbar A-P Control Brace	Mr. England
Tuesday	9:00-10:00	Completion and Fitting of A-P Control Brace (lab)	Faculty
	10:00-11:30	Critique	Faculty
	11:30-12:30	Modifications of Thoracolum-bar A-P Control Brace: Sternal Plate, Thoracic Band, Lateral Uprights	Mr. Fillauer
	1:30- 2:00	The Thoracolumbar A-P, M-L and Rotary Control Brace: Patterns for Sub-Clavicular Extensions	Mr. England
	2:00- 2:30	The Thoracolumbar A-P, M-L and Rotary Control Brace: Patterns for Sub-Clavicular Extensions (lab)	Faculty
	2:30- 6:00	Fabrication and Assembly of the A-P, M-L, and Rotary Control Brace (lec and lab)	Mr. Fillauer
Wednesday	9:00- 9:30	Fitting of A-P, M-L, and Rotary Control Brace	Faculty
	9:30-10:30	Critique	Faculty
	10:30-11:00	Measurements for Anterior Hyperextension Brace	Mr. Glancy
	11:00-11:30	Measurements for Anterior Hyperextension Brace (lab)	Faculty
	11:30-12:00	Select and Adjust Brace Ac-cording to Measurements	Mr. Glancy
	1:00- 2:00	Select and Adjust Brace Ac-cording to Measurements (lab)	Faculty
	2:00- 2:30	Fitting the Anterior Hyper-extension Brace	Mr. Glancy
	2:30- 3:30	Fitting the Anterior Hyper-extension Brace (lab)	Faculty

Date	Hour	Subject	Instructor
	3:30- 5:00	Critique	Faculty
Thursday	9:00-10:00	Functions and Fitting of Stock Collars	Mr. Glancy
	10:00-10:30	Patterns for Custom Collars	Mr. Glancy
	10:30-11:30	Patterns for Custom Collars (lab)	Faculty
	11:30-12:00	Fabrication of Custom Collars	Mr. Fillauer
	1:00- 2:00	Functions and Fitting of Poster Cervical Appliances	Mr. Fillauer
	2:00- 3:30	Functions and Fitting of Poster Cervical Appliances (lab)	Faculty
	3:30- 4:30	Critique	Faculty
Friday	9:00-10:30	Orthotic Management of Spinal Pathology	Dr. McCauley
	10:30-12:00	Introduction to Scoliosis	Dr. McCauley
	1:00- 3:30	Introduction to the Milwaukee Brace	Faculty
	3:30- 4:30	Critique and Final Exam	Mr. England

FIGURE 1

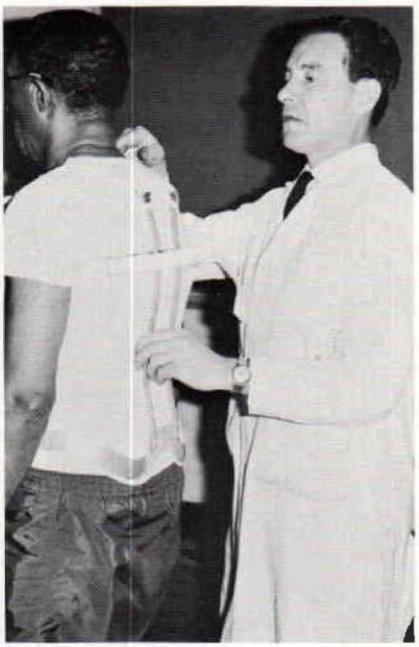

FIGURE 2

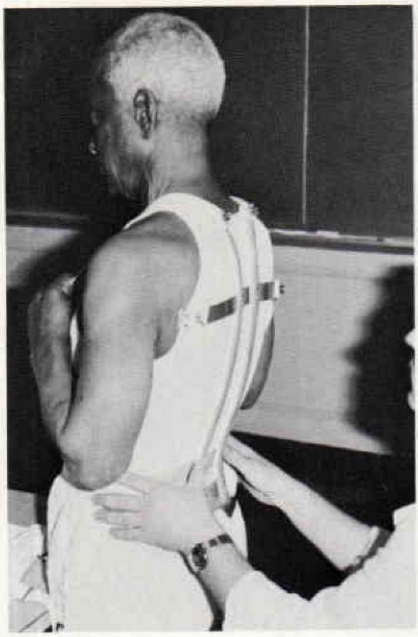

FIGURE 3
FIGURE 1-3—Fitting Thoracolumbar Anteroposterior Frame

FIGURE 4—Bench Alignment of Thoraeolumbar Anterposterior Frame

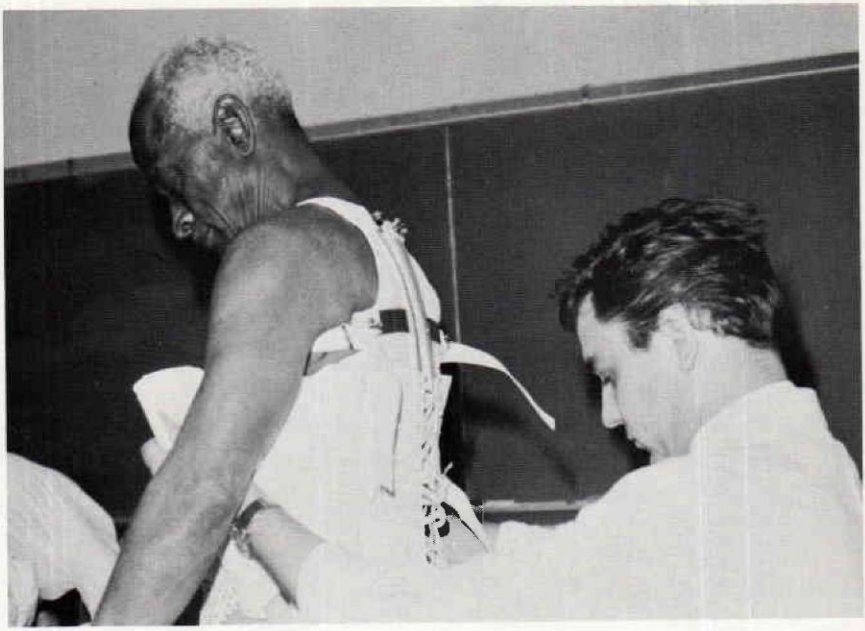

FIGURE 5—Fitting Full Lumbosacral Corset over Thoracolumbar Frame.

FIGURE 6

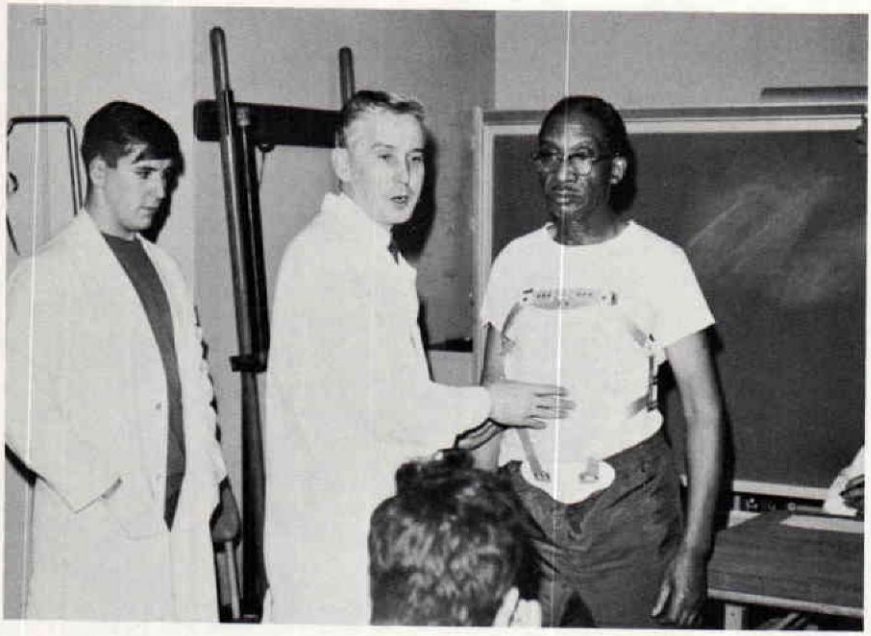

FIGURE 7
FIGURE 6-7—Critique of Student Fittings of Thoracolumbar Anterior Control Brace.