Newsletter

Prosthetics and Orthotics Clinic

Vol. 5, No. 1, 2/1981

Winter/Spring

SCOLIOSIS:

ORTHOTIC MANAGEMENT CONCEPTS

Edward P. Van Hanswyk, C.O.*

The orthotic management of idiopathic scoliosis (fig. 1) over the years has employed a number of different orthotic systems. Included among them have been the Milwaukee and modified cervico-thoracic-lumbo-sacral orthoses (C.T.L.S.O.) as well as various prefabricated, modular, and custom fabricated thoracic-lumbo-sacral orthoses (T.L.S.O.).

The prescription of any of the systems is dependent upon a number of variables, including the level and degree of curvature, the degree of rotation, the age and physical condition of the patient, and the degree of patient cooperation expected.

No matter which system is selected, and no matter which set or combination of variables is present, there exists a number of orthotic management principles for consideration. The purpose of this paper is to outline these principles and theories, the similarities and differences presented by scoliosis, and orthotic management systems employed.

In order to present these relationships, a number of somewhat original, and perhaps not so original, orthotic management concepts and theories are discussed. The theories include: 1. the reasons for reducing lumbar lordosis; 2. the idea and employment of a "righting reflex," both sagittal and coronal; 3. the concept of "costal distraction"; 4. the importance of axial alignment; and 5. a theory concerning the deviations of scoliosis, the creation of forces, and the force systems necessary for their control and correction.

Lumbar Lordosis

Historically, there has been an emphasis over the years on the reduction of lumbar lordosis (fig. 2) in the orthotic management of the spine, especially in the orthotic management of scoliosis with the C.T.L.S.O. and the T.L.S.O., for a number of reasons.[1,2]

a. In the orthotic management of a lumbar or thoraco-lumbar scoliosis,

Figure 1

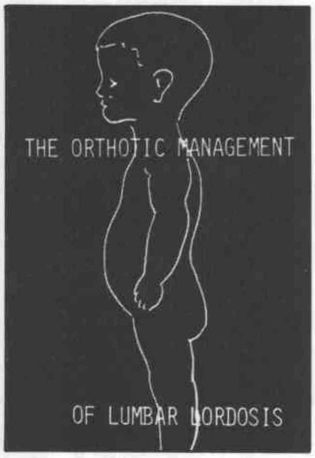

Figure 2

NEWSLETTER READERS — PLEASE NOTE

Due to the move of the National Office and editorial staff turnover, the publication of the NEWSLETTER fell behind schedule. Now both the Winter and Spring editions are ready for publication. Therefore, on a one-time basis, and in the interest of reducing costs for postage and handling, this NEWSLETTER is a COMBINED WINTER-SPRING issue which will explain its larger than normal size.

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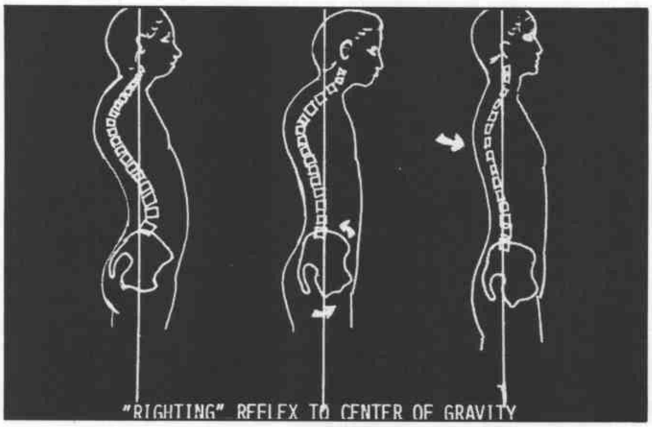

Figure 3

flexion of the lumbar spine has a positive effect on scoliosis. The distraction that occurs between the thoracic spine and sacrum reduces lumbar scoliosis. The reasons presented for this "correction" include the release of the hip flexors and resultant pelvic tilt, and the stretch of the posterior longitudinal ligaments; the net result being an improvement of the lumbar scoliosis.

b. When managing a lumbar curve in an orthosis with a corrective force from the posterior lateral direction in an attempt to reduce scoliosis and vertebral rotation by compressing of muscle bulge, it is necessary to provide an anterior counterforce to prevent an increase in lordosis.

c. Recognizing that the thoracic and lumbar spine are interrelated, efforts to control lordosis with encasement and stabilization of the pelvis produce an opportunity for leverage and corrective forces, both inductive and direct, to be applied to the thoracic spine.

"Righting Reflex"

The "righting reflex" (fig. 3) is an example of an inductive force. When producing flexion of the lumbar spine, the kyphotic posture of the thoracic spine accentuates a forward flexion of the shoulder and head. The body's natural tendency to right itself over the center of gravity produces an extension or reduction in thoracic kyphosis. This sagittal plane reflex can be utilized in the orthotic management of Scheurmann's kyphosis and idiopathic scoliosis.

Another "righting reflex" force developed is in the coronal plane. In double curves, thoracic and thoracolumbar, when the lumbar curve is reduced, causing a lateral shift of the head and shoulders, the body's natural tendency to right itself results in a reduction in thoracic scoliosis as well.

In the orthotic management of scoliosis in a C.T.L.S.O., the "righting reflexes" can be planned as an adjunct to the direct counter-lateral and anti-rotational forces of the thoracic pad.

In a T.L.S.O., this inductive extension is aided by a fulcrum created by the superior trim line of the orthosis. In theory, even though the length of the lever arm superior to the apex of the thoracic curve does not appear adequate for a significant force to be applied, the planned instigation of "righting reflex" forces is used to augment a lesser, direct force.

Axial Alignment

The encasement and stabilization of the pelvis provides the counter-force and leverage for direct force application to the thorax as well.

Because of the rotational component present in scoliosis, axial alignment of the body, rib cage and pelvis is necessary. The direct force created by symmetric alignment of the pelvic and thoracic surfaces of the orthosis results in a direct anti-rotational corrective force. This is particularly applicable in the orthotic management of a thoracic curve in a T.L.S.O. Since the rotational component present in a scoliosis is one variable that may preclude the use of a T.L.S.O., management of rotation in this system can be viewed as critical.

"Costal Distraction"

Another direct force advantage created by the encasement of the pelvis is "distraction." Stabilization of the pelvis and the "total contact" encasement of the lower rib cage in a T.L.S.O. produces an opportunity to maximize the distance between the pelvis and the rib cage, resulting in a distraction of the lumbar spine. The flattened abdominal surface induces lumbar flexion and also increases the intra-abdominal pressures, augmenting this force. The resultant costal-pelvis distraction is another planned, direct force in the orthotic management of lumbar scoliosis in a T.L.S.O.

Orthotic Management Goals

The concepts and theories presented might now be viewed in relation to orthotic management goals relative to scoliosis, specifically the evaluation of the various scoliosis deviations and the corrective forces available in the orthotic management system employed.

In the normal spine, the muscles act antagonistically on either side to maintain a straight, neutral spine. The spine, rib cage, and pelvis are symmetrically related and supported by the musculature.

In the scoliotic spine, as the vertebrae rotate and move laterally, the muscles lose their lever-arm advantage, and the spine, rib cage, and pelvis lose their symmetry. The orthotic management goals then become:

a. repositioning of the vertebrae, not only by direct forces, but also by inductive reflex forces.

b. re-establishment of muscle levers and re-establishment of symmetry of the rib cage and between the rib cage and pelvis.

Thoracic Scoliosis (Two Deviations)

In identifying the orthotic system to be used, the differences in scoliosis deviations should be recognized.

Thoracic scoliosis (fig. 4a) is seen as a two-deviational deformity, 1. a lateral deviation, the curve, 2. a rotational deviation, the rib prominence. Theoretically a three-directional force system is necessary for management of these deviations. The choice of C.T.L.S.O. or T.L.S.O. force systems depends, of course, on the variables outlined previously.

In the three-directional force system C.T.L.S.O. (fig. 4b), the forces include, 1. the counter-lateral force of the thoracic pad, 2. the anti-rotational force of the thoracic pad, and 3. the distractive force of the pelvic base opposed by the occipital portion of the neck ring.

Certain thoracic curves can be managed also in a T.L.S.O. system: The two-deviational deformity of thoracic scoliosis managed with the lateral and anti-rotational force of the axially aligned surfaces of the orthosis, augmented by the righting reflex inductive forces, coronal and sagittal.

Figure 4a

Lumbar Scoliosis (Three Deviations)

Thoraco-lumbar and lumbar curves (fig. 5) are seen as a three-deviational deformity (fig. 6). In addition to the lateral and rotational deviations there is usually a tendency toward lordosis. The asymmetry and loss of muscle levers and the shape of the lumbar vertebrae allow hyper-extension which contributes to a third deviation. It becomes necessary to incorporate a four-vector force system to manage this three-deviational deformity.

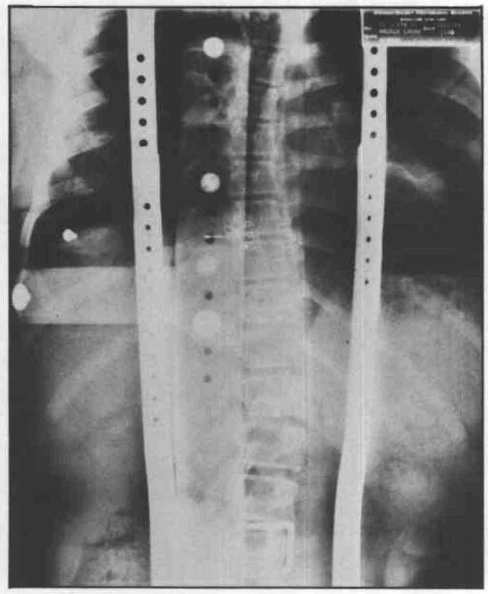

Figure 4b

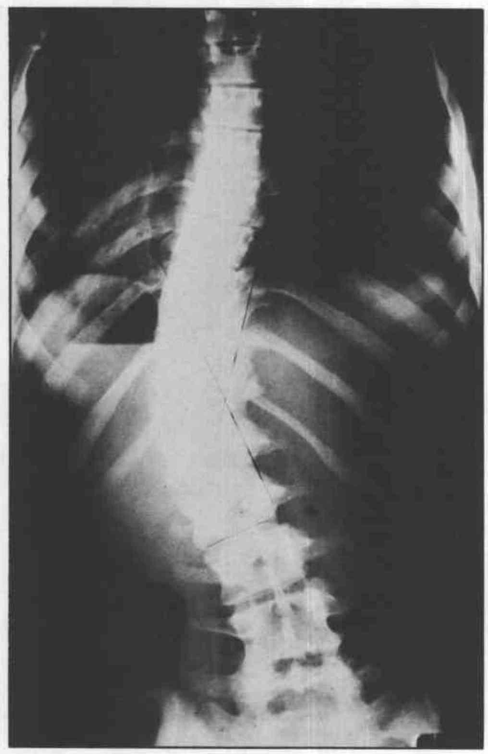

Figure 5

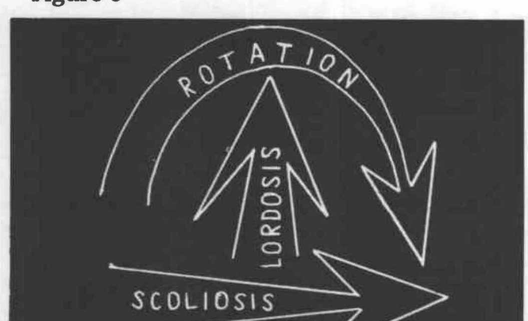

Figure 6

The four-vector force system T.L.S.O. (fig. 7) contains: 1. anti-lordotic, 2. lateral, 3. anti-rotational, and 4. costal distraction forces, all described earlier.

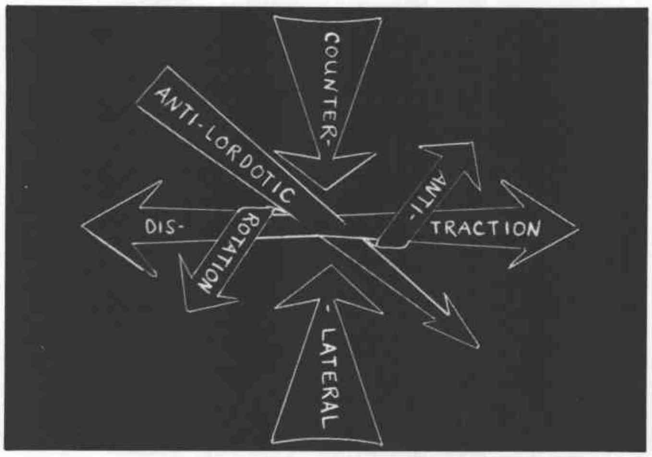

Figure 7

In summary, understanding of the concepts and theories presented is necessary to provide the orthotic management system reflecting the re-positioning and forces required for appropriate correction.

[1]Van Hanswyk, Edward P., Hansen, Yuan, and Eckhardt, Wayne, A., "Orthotic Management of Thoraco-Lumbar Spine Fractures with a 'Total-Contact' TLSO," *Orthotics and Prosthetics Journal*, Vol. 33, No. 3, pp 10-19, September, 1979.

[2]Van Hanswyk , Edward P. and Bunnell, William P., "The Orthotic Management of Lumbar Lordosis and the Relationship to the Treatment of Thoraco-Lumbar Scoliosis and Juvenile Kyphosis," *Orthotics and Prosthetics Journal*, Vol. 32, No. 2, pp 27-34, June, 1978.

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Inadvertently, Dr. Justin Alexander's author identification did not appear in the last issue of the *Newsletter*. He is the director of the Division of Physical Therapy, Department of Rehabilitation Medicine, Albert Einstein College of Medicine of Yeshiva University, Bronx, New York. We apologize for any inconvenience this omission may have caused.

MEETINGS and EVENTS

1981, March 20-21, "Access to Technology" conference, Rehab Engineering Center of the Children's Hospital at Stanford, Stanford University, Palo Alto, California.

1981, April 9-11, "ITT Course on Biomechanics of the Locomotive System," Surgery Service of the Locomotive System, the Hospital de San Rafael, Barcelona, Spain.

1981, April 23-25, AOPA Region IV Regional Meeting, Hyatt Regency, Lexington, Kentucky.

1981, May 1, 2, AOPA Region I, Hyatt Regency, Cambridge, Massachusetts.

1981, May 8-10, Region V Regional Meeting, Plymouth Hilton Inn, Plymouth, Michigan.

1981, June 5-7, AOPA Region IX and COPA Combined Meeting, Doubletree Inn, Monterey, California.

1981, June 12-14, AOPA Regions II and III Combined Meeting, Host Farms, Pennsylvania.

1981, June 16-21, AOPA Regions VII, VIII, X and XI Combined Meeting, Four Seasons Motor Inn, Colorado Springs, Colorado.

1981, June 25-27, AOPA Region VI and Midwest Chapter of AOPA, Holiday Inn, Merriville, Indiana.

1981, October 27-November 1, AOPA National Assembly, Sahara Hotel, Las Vegas, Nevada.

1982, February 17-20, AAOP Roundup Seminar, Royal Sonesta Hotel, New Orleans, Louisiana.

An Editorial

ORTHOTICS FOR SPINAL DEFORMITY: 1980 VIEW

Thirty-three years ago the Milwaukee brace made its first appearance, originally designed as a postoperative immobilizing and corrective device. Soon thereafter, it began to be used as a non-operative treatment method for both scoliosis and kyphosis. Between 1950 and 1970, the brace was gradually improved and the system of non-operative treatment became more refined, with more knowledge of the indications and contraindications.

In Europe in the 1960's and in North America in the 1970's, a wave of new braces appeared, all attempting to control spinal curvatures without surgery. The corset Lyonnaise, the Riviera brace, the Pasadena brace, and finally the Boston brace and the Wilmington jacket were all basically "underarm" orthoses, although most could be extended up to a neck ring for special circumstances.

The "underarm" orthoses were, of course, more esthetically pleasing to the child, but there was considerable controversy as to whether they could achieve the same quality of curve control as was achieved by the Milwaukee brace.

About this time, i.e. 1975, relatively long-term studies of the Milwaukee brace experience began to appear, not just what the curve was at the time of brace stoppage, but what was happening to those curves five and ten years later. It became increasingly apparent that there was a wide spectrum of brace results, even when ideal circumstances of brace manufacture, curve selection, and patient cooperation existed. The *average* result was a curve the same at the end as at the beginning.

Why then use an orthosis if there is to be no correction? The answer is obvious: to prevent progression. We have learned through experience that orthoses are *not* designed to make large curves permanently into small curves. Orthoses *are* designed to keep small curves small.

Should all small curves, therefore, be braced? The answer is "no," since many small curves are nonprogressive and do not need treatment of any kind. An 18° thoracic idiopathic scoliosis in a pre-menstrual 13 year-old girl has a 63 percent chance of being nonprogressive without treatment and a 4 percent chance of spontaneously improving without treatment. There is only a 33 percent chance of her curve progressing, and therefore she needs treatment only if progression is well-documented.

What kind of a brace is best? It depends on multiple factors as to which brace is best for which patient. All too often, proponents of a particular design will claim that their design is best and will solve all problems. As in all phases of medicine, there is a spectrum of diseases and a spectrum of solutions. The pendulum of enthusiasm swings first one way (the Milwaukee brace only), and then the other (underarm orthoses only), and finally settles in the middle.

The current "middle ground" of orthotic management is best expressed by that sophisticated program in which the orthotist and orthopaedic surgeon work together to design an orthosis for the specific child's curvature problem. For a lumbar or thoracolumbar curve, they will use an orthosis that exerts correctional and stabilizing forces on the curve, but does not extend up to the neck, i.e., some type of underarm orthosis. If there is a decompensation problem, a trochanteric extension will be employed.

If the curvature is in the thoracic spine, i.e., the apex is at T7, an orthosis is needed which will give a maximal effect at that area. The best orthosis is still the Milwaukee brace, regardless of whether the curve problem is a kyphosis or a scoliosis.

Why is a Milwaukee brace best for such thoracic curves? It is best because it is designed to apply its forces in that area without negative effects on other areas. Those who suggest that an underarm orthosis can achieve the same result are looking only at the roentgenogram, not at the patient. It is of no benefit to create a "good looking" roentgenogram, if at the same time the patient has decreased lung function, permanent alteration of rib cage dimensions, skin sores, digestion problems, or any of the other secondary effects which improper bracing can create.

In summary, we have reached a point of professional advancement in which children with progressive curvatures are being detected early enough to permit nonoperative control (not "correction") by orthoses. We are sophisticated enough not to overtreat small curves, nor to attempt to orthotically treat curves needing surgery. We now have a wide selection of orthotic devices from which to choose for the individual patient and her or his specific curve problem. We must stop looking just at an anteroposterior roentgenogram and begin to look at the patient as a three dimensional individual. Finally, we must recognize defeat — sometimes the orthosis just doesn't work and the patient needs surgery.

Robert B. Winter, M.D.
Professor of Orthopedic Surgery
University of Minnesota

CROSS-DIAGONAL CLOSURE OF PELVIC AND SPINAL APPLIANCES

By Louis Ekus, C.O.*

The pelvic region with its numerous bony prominences, subcutaneous structures, and varied contours, has long been a useful site for the stabilization of many different orthoses and prostheses. The Milwaukee orthosis, body jackets, prostheses for hemipelvectomy and hip disarticulation amputees, to name a few, often maintain high internal forces as components of complex three-point pressure systems. Due to the nature of these devices, the internal forces are often quite different on the patient's opposing sides. Most practitioners are already aware that when the differences in the forces from right to left sides becomes large enough, relative motion of the two sides of the appliance becomes a difficult problem. This motion, in the superior or inferior direction in the frontal plane, causes skin breakdown, irritations, torsional stress on the devices and, thus, provides less than optimal function. In hip disarticulation and hemipelvectomy prostheses, "pumping" can be attributed to a great extent to the lack of the closures to maintain effective apposition of the two sides of the socket. The cross-diagonal closure is one way of dealing with this undesirable movement effectively.

Figure 1

When the attachment points of closure straps are placed horizontally across from one another, as in conventional practice, the long axis of the straps is perpendicular to the direction of the relative movement between the two sides. A large amount of this motion can then occur with little increase in the distance between these points. This fact, in addition to the high degree of compression and migration of the tissue in the pelvic region, contributes greatly to the problem. In this case, the unwanted action can take place due to a lack of increased tension on the closure straps at the onset of the motion. However, if the points are placed so that the long axis of the straps will *not* be perpendicular to the direction of movement, the distance change between these points per unit of motion is much greater.[1] This will cause a rapidly increasing tension on the straps, hence restricting additional movement.

Each strap in the cross will restrict translation in one direction; motion in the other direction will bring the attachment points closer together, and the strap will loosen. Application of the cross introduces a strap for the limitation of motion in both directions (fig. 1).

When applied to prostheses, a visible difference in the amount of relative motion possible could be noted between the conventional closure and the cross-diagonal closure (fig. 2). The appliances with the crossed type were no more difficult to don and doff than the corresponding conventional types. This closure is presented here because of the similarities in the pelvic sections of both prostheses and orthoses along with the similarities in the problems that accompany each. The cross-diagonal closure may be utilized as an important new method of optimizing increased effectiveness and patient comfort.

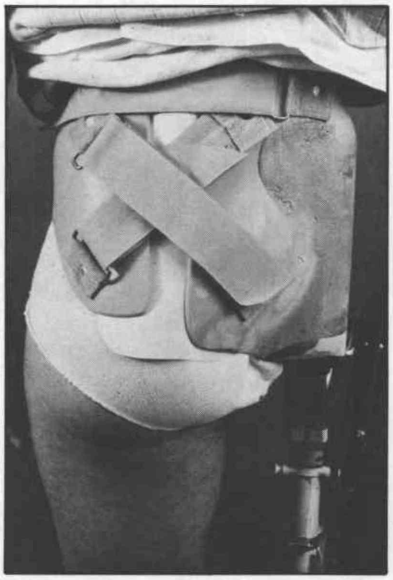

Figure 2

[1] This physical phenomenon is explained trigonometrically by the fact that the difference in the sine functions of a one degree (1°) change (0° to 1°) near the horizontal is much larger than the difference in the sine function of a one degree (1°) change near the vertical (89° to 90°).

Currently medical student at the School of Medicine, Universidad del Noreste, Tampico, Mexico; formerly a staff orthotist, Institute of Rehabilitation Medicine, New York University Medical Center.

Lower-Limb Orthotics Survey

In the Summer 1980 Issue of the Newsletter a relatively short questionnaire regarding the nature of lower-limb orthotics practice was included. Frankly the number of completed questionnaires received from members of the profession has been disappointing. It may be that the instructions for completion of the form were not presented as clearly or as prominently as they should have been.

Since the need for the requested information remains pressing, the questionnaire is being reprinted on the following pages with the plea that each facility that has not already done so, complete the form and return it to Prosthetics & Orthotics, NYU Post-Graduate Medical School, 317 East 34th St., New York, NY 10016, as soon as possible. It should take no more than 10 to 15 minutes to complete it.

Obviously only one questionnaire for each facility should be submitted since duplicate returns would tend to unbalance the information gathered. Lastly, in order to identify regional differences and to permit the possibility of follow-up contacts, we ask that each return be identified. In order to avoid any possible intrusion on confidential business statistics all of the information requested is limited to percentages of total practice.

May we point out again, that your cooperation is of significant importance, since it is not possible at the present time, to obtain a satisfactory overview of the nature of orthotics practice nationwide with any degree of confidence. This fact presents particular problems for the educational institutions who are obliged to teach students those procedures and techniques which are most widely utilized by the practitioners. The same lack of information weakens the ABC examination process and causes severe difficulties for potential researchers in relation to their ability to identify and undertake valuable and meaningful projects. Consequently there is a crying need for more current information than is presently available and the only reliable source of such data is from the individual certified orthotics facilities throughout the country.

As an aid in completing the questionnaire, the most common types of lower-limb orthoses in current use are listed below for use in completing questions II-C, 3 and 4 of the questionnaire on the next page.

Types of Lower Limb Orthoses

AFO (Ankle-Foot Orthosis)

1.) Double Bar Metal
2.) Single Bar Metal (lateral or medial upright)
3.) PTB Weight-Bearing
4.) Plastic Posterior Leaf Spring (PLS)
5.) Shoe Clasp
6.) Spiral
7.) Hemispiral
8.) Plastic Solid Ankle
9.) Torsion Shaft (Below-Knee Twister Cable)
10.) Other (Specify)

KAFO (Knee-Ankle-Foot Orthosis)

1.) Single Bar Metal
2.) Double Bar Metal
3.) Double Bar Metal Quadrilateral Brim
4.) Double Bar Metal Ischial Ring
5.) Craig-Scott
6.) All-plastic KAFO
7.) Metal Joints, Metal Uprights, and Plastic Shells
8.) Other (Specify)

KO (Knee Orthosis)

1.) With metal knee joints (e.g. attached to elastic/corsets/plastic/leather/cuffs)
2.) Plastic Supracondylar knee orthosis (SKO)
3.) Supracondylar/Suprapatellar-Nitschke (SK/SP KO)
4.) Three-Way Knee Stabilizer (TKS)
5.) Lenox Hill Derotation Brace
6.) Other (Specify)

HKAFO (Hip-Knee-Ankle-Foot Orthosis)

1.) Double Bar Metal
2.) Single Bar Metal
3.) Metal Joints, Metal Uprights and Plastic Shells
4.) Torsion Shaft (Above-Knee Twister Cable)
5.) Other (Specify)

THKAFO (Trunk-Hip-Knee-Ankle-Foot Orthosis)

1.) Metal HKAFO with Spinal Attachment
2.) Parapodium
3.) Standing Brace
4.) Reciprocal Orthosis
5.) Orthowalk
6.) Other (Specify)

HO (Hip Orthosis and Legg-Perthes Orthoses)

1.) Rancho Los Amigos Hip Control - Abduction orthosis
2.) Spreader Bar
3.) Pavlik Harness
4.) Legg-Perthes: Scottish Rite
4.) Legg-Perthes: Ilfeld Hip Abduction Orthosis
6.) Legg-Perthes: Trilateral
7.) Legg-Perthes: Toronto
8.) Other (Specify)

Survey of Lower Limb Orthotics Practice

Facility Name ______________________ Address ______________________ Date ________

Please answer all questions on the basis of experience in fitting orthoses DURING JAN. - JUNE 1980.
Note: Replies to Questions IA, IIA, IIB, IIC-1, IID, IIE & IIF should each total 100%.

I. Orthotics Practice

A. What percentage of your orthotics patients were provided with:
Lower Limb Orthoses _____% Spinal Orthoses _____% Lower & Spinal Combined _____%

Upper Limb Orthoses _____%

II. Lower Limb Orthotics (LLO)

A. The age range of LLO patients varied as follows:
Under 6 years _____% 6 - 20 years _____% 21 - 60 years _____% Over 60 years _____%

B. The disorders among the LLO patients varied as follows:
Musculo-skeletal (arthritis, dystrophies, fracture, hemophilia) _________%
Lower motor neuron (polio, peripheral nerve lesion) _________%
Upper motor neuron (stroke, cerebral palsy) _________%

C. Please answer questions 1 through 4 carefully, considering each of the following categories:

	AFO	KAFO	KO	HKAFO	THKAFO	HO
1. Types of orthoses fitted:	---------- %	---------- %	---------- %	---------- %	---------- %	---------- %
2. Percentage of above fitted bilaterally:	---------- %	---------- %	---------- %	---------- %	---------- %	---------- %
3. List the 3 **most** frequently fitted orthoses (from listing on page 10):	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______
4. List the 3 **least** frequently fitted orthoses (from listing on page 10):	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______	a.______ b.______ c.______

Survey of Lower Limb Orthotics Practice
(Continued)

D. AFO's (Ankle-Foot Orthoses)

1. *The primary characteristics of the AFO's fitted were:*
   - ______% Free dorsi and plantarflexion
   - ______% Assisted dorsi and/or plantarflexion
   - ______% Limited dorsi and/or plantarflexion
   - ______% No motion at ankle
   - ______% Other. Please specify: ____________________
2. *The materials used in the AFO's were:*
   - ______% Metal uprights with leather cuffs
   - ______% Plastic PLS (Specify plastics most frequently used): a. __________ b. __________ c. __________
   - ______% Metal uprights with plastic cuffs
   - ______% Other. Please specify: ____________________

E. KAFO's (Knee-Ankle-Foot Orthoses) and HKAFO's (Hip-Knee-Ankle-Foot Orthoses)

1. *The primary knee control offered by KAFO's and HKAFO were:*
   - ______% Valgum control
   - ______% Varum control
   - ______% Recurvatum control
   - ______% Flexion control
   - ______% Other. Please specify: ____________________
2. *The KAFO and HKAFO materials utilized were:*
   - ______% Metal uprights with leather cuffs
   - ______% Plastic (Specify plastics most frequently used): a. __________ b. __________ c. __________
   - ______% Metal and plastic
   - ______% Other. Please specify: ____________________

F. KO's (Knee Orthoses)

1. *The primary functions of the KO's were:*
   - ______% M-L control
   - ______% Recurvatum control
   - ______% M-L and extension control
   - ______% M-L extension and rotary control
   - ______% Other. Please specify: ____________________

G. Fracture Bracing (University of Miami or Rancho Los Amigos types)	**Tibial Fracture**	**Femoral fracture**
1. *How many such orthoses have you fitted during the past 6 months?*	______	______
2. *How long after the initial injury were these fracture orthoses usually applied?*	______	______
3. *Do you use pre-fabricated or custom-molded components?*	______	______
4. *What materials (e.g., Orthoplast/Light cast/Aquaplast/polypropylene) do you prefer to use for these fracture braces?*	______	______

INTERNATIONAL COURSE ON LOWER-LIMB ORTHOTICS, DALLAS, TEXAS

The U.S. National Committee of the International Society for Prosthetics and Orthotics, in cooperation with the Texas Scottish Rite Hospital for Crippled Children and the Division of Orthopedics, The University of Texas Health Science Center at Dallas, sponsored a week-long instructionl course on lower-limb orthotics March 9-13, 1981. The course covered not only design philosophy, prescription, fabrication, and application, but also comparative materials.

The lectures were intended to be useful not only to orthotists, but also to physicians, surgeons, podiatrists, therapists, engineers, and administrators, and to provide information that could be applied immediately in clinical practice. Manuals and literature were provided for future reference to all participants.

The course outline was developed so as to consider orthotic systems for upper- and lower-motor neuron lesions, cerebral palsy, fractures of the long bones, Legg-Perthes disease, and disorders of the foot. Orthopedic footwear was discussed extensively.

The announced program drew participants from all over the world. Many were from Europe, but Egypt and Australia were also represented. Approximately half were from foreign countries; the various states were well-represented, including Hawaii.

Questionnaire

Since the scope of the *Newsletter, Prosthetics and Orthotics Clinic* has been expanded, we would appreciate your reaction to a possible change of title:

1. Keep as is ☐
2. Digest of Prosthetics and Orthotics Clinics ☐
3. Orthotics and Prosthetics Clinics ☐
4. Orthotics and Prosthetics Digest ☐
5. Other: ______________________

Rehabilitation Engineering International Foundation

AN INDEPENDENT ORGANIZATION DEDICATED TO THE HANDICAPPED AMONG US

Statistically, there is an 80% chance that each one of us will need an Orthopedic aid or a Rehabilitation Engineering service at some point in our life.

The Rehabilitation Engineering Foundation aims to create an environment where helping our handicapped fellow man is commonplace. We aim at the helpers and those in need of help. In this way not only that the handicapped, the elderly and the sick will get the necessary assistance but our retired folk, students, neighbors, relatives as well as the professionals will get involved in this socially worthy and genuinely satisfying endeavor.

There are many willing people to do this God's work, but suitable designs and information are needed, therefore WE MUST CREATE A MILIEU WHERE "LOW TECHNOLOGY" WILL GROW.

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