

Abstracts from the 1985 AOPA Annual National Assembly

As a service to all those unable to attend the 1985 AOPA Annual National Assembly in San Diego—October '85—below are reprinted the abstracts of the papers that comprised the Assembly's Scientific Sessions. The speaker's names are italicized.

Medical and Surgical Management of Geriatric Amputees, *James M. Malone, M.D. and Joseph M. Leal, CP*, University of Arizona/Tucson VA Medical Center, South 6th Avenue, Tucson, AZ 85763.

Our presentation will be based upon the performance of approximately 600 lower extremity amputations over the past seven years. Two-thirds of our patients are over 65 years of age, and approximately 20 percent have diabetes mellitus. We will focus on primarily three areas of interest: current criteria for amputation level selection; postoperative patient rehabilitation; and evaluation and management of coexistent medical and vascular diseases. Criteria to be presented for amputation level selection include the use of intradermal Xenon-133, transcutaneous oxygen and carbon dioxide, doppler ankle pressures, IV fluorescein dye, and the photoplethysmograph. Discussion on postoperative management after lower extremity amputation will focus on early and rapid immediate prosthetic fitting with early physical rehabilitation. The diagnosis and management of ancillary medical problems and vascular disease during the preoperative and postoperative period will be discussed in detail. For the non-diabetic geriatric amputee, life expectancy approximates normal and there is no reason not to aggressively rehabilitate such patients. Although the diabetic geriatric amputee has a limited life expectancy, usually due to cardiac disease, re-

habilitation and independent ambulation is still a reasonable approach for the management of these patients.

Prosthetic Management of the Geriatric Amputee, *Joseph M. Leal, C.P.*, University of Arizona/Tucson VA Medical Center, South 6th Avenue, Tucson, AZ 85723.

No abstract available.

Above Knee Prosthetics for Geriatrics, *Joseph H. Zetttl, C.P.*, c/o American Artificial Limb Company, Inc., 1400 East Pike Street, Seattle, WA 98122.

Postsurgical management, fitting principles, socket designs and modifications as applied clinically for geriatrics are reviewed and discussed. Applicable auxiliary suspension systems and optimum component selection are also detailed for this group of patients.

Total Management of Geriatric Patients in Prosthetics, *Charles F. Schultz, C.P.*, Acme Laboratories, Inc., 10702 West Burleigh Street, Milwaukee, WI 53222.

Treatment of the amputee from the time of the surgical amputation through final fit of the definitive prosthesis. Treatment includes, but is not limited to, IPSF applica-

tion, rigid dressings, intermediate prosthesis application, stump shrinkers, elastic bandaging, check socket application, and final fit. Included is discussion regarding determination of the course of treatment to follow in particular cases.

Myoelectric Prostheses Versus Body Powered Prostheses with Unilateral, Congenital, Adolescent Below Elbow Amputees, Shirley A. Weaver, B.S., L.O.T.R., and Lawrence R. Lange, B.A., C.P.O., c/o Shriners Hospital for Crippled Children, 8400 Roosevelt Blvd., Philadelphia, PA 19152.

The purpose of this research was to study the feasibility of fitting adolescent, congenital, unilateral below elbow amputees with respect to fit, function, cosmesis, and cost efficacy. All patients studied were originally fit with body-powered, harness suspended prostheses, though two of the 10 patients studied had discontinued prosthesis usage prior to this project. All patients were given exams relating to function both prior to and after myoelectric fitting. In addition, detailed prosthetic histories were taken. At the end of the study, evaluations were made based on subjective and objective criteria related to fit, function, maintenance, and cosmesis.

Biomechanical Evaluations of the ISNY Flexible Above Knee Socket, Jiro Kawamura, M.D., Department of Rehabilitation, Osaka Rosai Hospital, 1179-3, Nagasone, Sakai, Osaka, Japan and Ichiro Kawamura, M.A., Kawamura Orthopedic Appliance Company, Ltd., 1-18-18, Renjinbashi, Kitaku, Osaka, Japan.

Over 50 prostheses incorporating the ISNY flexible above knee sockets have been fabricated in our facility. The subjective patient's evaluations for the sockets apparently seem to be very good. Using some biomechanical ways, we have evaluated the socket regarding the shape and the inner pressure at every phase of walking for three patients. We have found out

that the socket shape has been changed to strictly correspond to the muscle activity which is predominate in each walking phase. The inner pressures between the residual limb and the socket walls have been measured for the ISNY socket and conventional hard socket using some inner pressure sensors, and the result shows the pressures were lower in the ISNY socket.

Children's Titanium Modular System, Otto Schultz, C.P.O., IPOS GMBH and Company K.G., Postfach 1845, 2120 Lüneburg, West Germany and Dale Berry, C.P.(C), IPOS-USA, 155 Portage Road, Lewiston, NY 14092.

On April 18 and 19, 1984 in Ottawa, Canada, seven year old Matthew Parent, sponsored by the War Amputations of Canada CHAMP programme, was fitted with a flexible A/K socket and the first modular titanium above knee system for children in North America. A year has passed and we will review this young boy's progress and how his lightweight (three lb.) prosthesis has held up.

ADEPT Voluntary Closing Biomechanical Hands for Children: Experiences and Case Studies, Bob Radocy, M.S., T.R.S., Therapeutic Recreation Systems, Inc., 1280 28th Street, Suite 3, Boulder, CO 80303-1797.

ADEPT biomechanical hands are the first voluntary closing terminal devices ever produced commercially for children. They are designed to imitate the proven function of the larger GRIP terminal devices for adults but use materials deemed more appropriate for children with regards to safety and cosmesis. Two models were introduced in the Fall of 1984: the "F" for youngsters aged one to five, and the "B" for adolescents 10 to 14 years of age. Through a no obligation educational trial program offered by the manufacturer, over two hundred ADEPTs have received exposure and/or have been examined and evaluated with limb deficient children, their parents, therapists, physicians, and pros-

thetists. General experiences from these sources will be summarized to indicate acceptance/rejection, conversions, use, applications, success, failure, and suggestions/comments resulting from the first year's exposure to the devices. Case studies will be focused on the application of ADEPTs to specific children to highlight aspects of the general experiences which are discussed. New product developments and existing product improvements resulting from the first year's experiences with the ADEPTs will be discussed and will complete the presentation.

The ICEROSS System, Össur Kristinsson, C.P.O., Ossur hf., Hverfisgata 105, Box 5288, 125 Reykjavik, Iceland.

A new method for fitting below knee and above knee amputees is presented. ICEROSS stands for Icelandic Roll on Suction Socket. The system consists of: a) an injection moulded silicone socket that is relatively unstretchable axially but highly elastic radially, b) a coupling device for bottom to bottom connection to c) a rigid total contact socket, or alternatively, a flexible socket type ISNY. The silicone socket is fabricated over a high density plaster of paris model that is somewhat smaller in circumference than the original model. A Pelite® socket dummy is made over the model and a thin rigid socket is then laminated over the dummy. The dummy is removed and silicone injected into the two part mould thus created. The silicone socket is fitted over the original model and a rigid or a flexible socket made thereover. When donning the socket, the amputee turns it inside out and rolls it over the residual limb. The coupling device is connected to nylon tape that goes through the bottom of the rigid or flexible socket to a buckle on a posterior socket wall. The silicone socket adheres to the skin and acts like a second skin, transferring the action of interface friction from the skin-stump sock level to the interface level between the silicone and the supporting socket. The result is a total contact suction socket with excellent suspension and load distribution

properties, even for very short residual limbs.

An Ultralite Scandinavian Above Knee Prosthesis, Glenn F. Hutnick, C.P., Clinical Instructor, Department of Rehabilitation Medicine, College of Physicians and Surgeons, Columbia University, and David Sussman, Orthotist/Prosthetist, G.F.H. Orthotic and Prosthetic Laboratories, Inc., 128 Fort Washington Avenue, Suite C, New York, NY 10032.

The idea of an ultra light prosthesis for the geriatric amputee is not a new one. With the new availability of titanium modular components, lightweight SACH feet and Scandinavian socket designs, this area can now be revisited. The new titanium modular lower limb components in conjunction with lightweight SACH feet are making a large contribution to the management of the geriatric amputee. However, current socket designs are still increasing the weight of these prostheses. This paper is an attempt to demonstrate a lightweight design for the Scandinavian socket. Current techniques call for a laminated frame to support the Surlyn® socket. We will discuss a vacuum molded polypropylene frame designed to support the socket and function as attachment to the knee unit. The presentation shall include socket design, plastic molding techniques, fabrication, as well as fitting and finishing. Biomechanics of this system will also be introduced. Our goal is to review the benefits of such a lightweight system.

The Application of ISNY Principles to the Below-Knee Prosthesis, Sidney Fishman, Ph.D., Norman Berger, M.S., David Krebs, M.A., William Webb, B.S., C.P.O., Prosthetics and Orthotics, New York University Medical School, 317 East 34th Street, New York, NY 10016.

The ISNY below-elbow prosthesis consists of a thin, thermoplastic socket connected via volar and dorsal struts to the laminated distal portion. As in the above-

knee ISNY design, the socket is soft and flexible rather than hard and rigid; and the frame, while allowing for length, shape, and component attachment, is minimal in size and extent. Six unilateral, below-elbow amputees (ages eight to 18) have been fitted with this new socket utilizing a new cast, plaster model, and wrist unit, but the terminal device and harness type were unchanged. All subjects indicated that the ISNY was more comfortable than the conventional socket, being lighter, cooler and permitting the input of sensory stimuli. They also reported that wear times increased; however, reactions to cosmesis were variable. In summary, all subjects reacted enthusiastically to the new sockets. The fabrication methods involved included: a) vacuum forming the socket; b) frame lay up; c) frame trim; d) attachment of socket to struts; and e) harness attachment, will also be discussed.

Bracing for Back Pain, Lyle J. Micheli, M.D., 319 Longwood Avenue, Boston, MA 02115.

The use of bracing for back pain in adults and adolescents has been facilitated by recent developments in brace design and fabrication. Using prefabricated thermoplastic polypropylene or polyethylene braces with 0°, 15°, or 30° of brace lordosis, we have successfully managed more than 90 percent of our athletically active patients with back pain. Eighty percent of our adults with back pain have improved.

In order to successfully use bracing for back pain, an accurate initial diagnosis must be made. In adolescent back pain, spondylolysis and mechanical back pain are best treated with a 0° lordosis brace; discogenic pain with a 15° brace, and apophyseal fractures with 15° or 30° braces.

In adults, the 0° brace is ideal for spondylolysis, but may not, initially, be well tolerated, and a 15° brace may be required. Discogenic and arthrogenic pain is usually best treated with a 15° brace. No brace, of course, will successfully relieve back pain due to spinal trauma—so the importance of accurate initial diagnosis must be emphasized.

Lower Back Pain in Children and Adults, M.E. Miller, C.O., 40 Parkwood Drive, Milton, MA 02186.

No abstract available.

The Boston Scoliosis System—A Follow-Up Study, John E. Hall, M.D., John E. Emans, M.D., M.E. Miller, C.P.O., Children's Hospital, 300 Longwood Avenue, Boston, MA 02115.

Four hundred patients have been followed for a minimum of 18 months since the last time they wore their orthosis after treatment of idiopathic scoliosis using the Boston Scoliosis System. Half of the patients were fitted with low profile braces and the other half with an additional Milwaukee type superstructure. It was concluded that bracing does affect the natural history of idiopathic scoliosis because a subset of patients with curves over 30° at the onset of bracing, with two years of additional growth remaining, were successfully managed. The curves in that group were arrested in their progression in 90 percent of cases.

There were several interesting and unexpected findings. Results were as good in the group of patients who wore them full time. The low profile brace gave as good a correction as the brace with the superstructure in curves of T8 and below. Neither brace gave satisfactory results in curves with an apex of T7 and above. Total noncompliance with bracing led to surgery in a high proportion of cases. Compliance did not seem to be related to the type of brace, whether it was a high one or a low one. Adverse factors were the young age of the patient, increasing severity of curve, severe rotation, and a flat back with less than the normal amount of expected thoracic kyphosis.

Pelvic Stabilization as a Treatment for Low Back Pain, James H. Tyo, C.O., Tyo and Tyo, Limited, 633 East Walnut Street, Green Bay, WI 54301 and Lester A. Owens, D.O., Neurology and Rehabilitation As-

sociates, 704 S. Webster Avenue, Green Bay, WI 54301.

Our intent is to show the correlation between the motion of the SI joints and the L5/S1 junction as they relate to low back pain. A review of the results of 100 patients treated with a Pelvic Stabilization System will be presented. In addition, we will describe the system itself from an orthotic and from a medical viewpoint.

Clinical Considerations in the Orthotic Treatment of the Cervical Spine, *George Boyer, C.O., 1815 East Workman Avenue, "D", West Covina, CA 91791.*

The purpose of this paper is to identify various types of cervical fractures and other cervical anomalies that require orthotic treatment. It will review cervical anatomy, range of motion, discuss radiological identification, and demonstrate types of motion that are undesirable in the care of these conditions. Jefferson, dens, body, pedicle and handmans fractures, subluxations, malignancies, infectious processes, and degenerative cervical disease will be identified, and orthotic indications and contraindications from the presenter's experiences will be presented.

The Houston Halo—A Unique System for Providing Cervical Stability, *Raymond F. Allen, B.B.A., C.O., City Brace Company, Inc., 7227 Fannin, P.O. Box 20506, Houston, TX 77225.*

Over 12 years in development and after more than 1,500 applications, the Houston Halo is a new concept in cervical orthotics. This extremely lightweight system offers many advantages. The anterior/posterior opening two-piece jacket allows minimal patient movement during application and convenient access to the thorax without interrupting traction. A unique superstructure utilizing serrated discs for flexion/extension adjustment and ring clamps for anterior/posterior and rotational adjustment provides accurate and easy cervical positioning. Sping loaded shoulder at-

tachment posts reduce pin erosion and combine with L-shaped threaded uprights to allow a clear x-ray field and provide desired distraction/compression forces.

The Lerman Minerva Orthosis, *Max Lerman, C.O., 8710 Wilshire Blvd., Beverly Hills, CA 90211.*

This paper is presented giving our experience with a new cervical orthosis called the Lerman Minerva. Cervical injuries lend themselves to orthotic management. Readily available soft collars, Philadelphia collars, multiple post cervical braces, etc., have proven to be highly effective in the treatment of cervical injuries.

Over the past five years, this orthosis has been applied in our practice on 96 patients. In 93 cases, the orthosis was well accepted with little or no complications, complaints or adjustments. Sixty-five patients were fitted with the Lerman Minerva as a primary treatment. Ten patients were transferred to the Lerman Minerva from other orthoses. Seven patients with severe cervical injuries were transferred to halo vest fixation. Fourteen patients were fitted with the Lerman Minerva postoperatively for cervical fusions. Three patients rejected the Lerman Minerva for non-compliant reasons.

A New Development in Upper Limb Orthotics, *Arthur W. Guilford, Jr., C.O., 18437 Mt. Langley Street, Suite E, Fountain Valley, NY 10028.*

No abstract available.

Upper Limb Orthotic Options, *Joseph Wanchick, C.O., O.T.R., Rehabilitation Institute, Inc., 261 Mack Blvd., Detroit, MI 48201.*

The purpose of this presentation is to acquaint the orthotist with a wide variety of options available in the selection of orthoses for upper limb treatment. Numerous factors need consideration before a

final choice is made. The skill of the orthotist, his rapport with the referring physician, the availability of central fabrication, and restrictions of third party payers may influence the approach to treatment. Other factors may be the choice of materials used for fabrication, whether the orthosis can be made from measurements or a positive mold, or if it can be directly formed to the patient. Presently, there are a variety of commercially available orthoses for the upper limb that can be custom-fit. Slides depicting these options will be shown and a handout of sources of prefabricated upper limb orthoses will be distributed.

Double Flexure Designs for Orthotic Ankle Joints, *J. Martin Carlson, C.P.O., Bruce M. Day, Orthotist, Gillette Children's Hospital, 200 East University Avenue, St. Paul, MN 55101.*

The orthotic and prosthetic laboratory at Gillette Children's Hospital has developed two designs for double flexure orthotic ankle joints. The double flexure design approach retains the weight and cosmetic advantages of plastic while providing three advantages over the posterior leaf design. The flexures can be located for congruency between anatomic and orthotic joint axes. The desired ankle range of motion is almost totally free of resistance, and the degree of motion restraint can be easily and precisely controlled. During the past several years, we have provided several hundred of these orthoses with primary application in the areas of cerebral palsy and post-op orthotic treatment of resistant clubfoot deformities. At the present time, more than 25 percent of the ankle-foot orthoses provided at Gillette Children's Hospital include a double flexure type ankle joint.

Experiences with a Rotational Control, Reduced M-L Orthotic Brim for Knee Ankle Foot Orthosis, *Glenn Ham-Rosebrock, C.O., 9258 Gardendale, Bellflower, CA 90706.*

This is a report of experiences with an alternative thigh shell design, as opposed

to the quadrilateral brim, in the treatment of post polio in the lower extremities. The design was originally developed in an attempt to stabilize atrophied tissue, which is lacking in the patients studied with the quad brim shape. It also eliminated the technical difficulties encountered with the negative and positive cast modifications by the orthotist. Between 1981 and the beginning of 1985, we have treated approximately 100 patients, 10 percent of whom were bilateral. Indications and contraindications will be discussed. We have conducted careful clinical analysis of the remaining patients. A majority of the patients had totally flail lower extremities, from the hips distally, with associated genu valgus/recurvation, leg length discrepancies, and external rotation instability of the hip. The average age of the patients treated was approximately 13, ranging from five to 65. These findings appear to support our concept that function of the patient is benefitted with a reduced M-L.

Conservative Management of Sports Related Traumas with Foot Orthotic Devices, *Richard D. Schwartz, President, APEX Foot Health Industries, 330 Phillips Avenue, South Hackensack, NJ 07606.*

Sport orthotic devices discussed in detail, including their applications for preventive medicine and treatment. Complete analysis of running injuries: an assessment of foot shape, foot trauma, and footwear design, appropriate shoe fitting, shoe style and design, and orthoses. Diagnosis and fabrication of sports orthoses. Specific diagnoses and indicated fabrications discussed in detail. Protecting and relieving over use and stress from sports activities: shock absorbing materials, heel-to-toe design, flexible materials, educating patients, achieving proper foot position. Background presentation and injury statistics (*The Injured Athlete*, Daniel N. Kulund, M.D., 1982) relating to pronated, cavus, and neutral foot: metatarsal and intermetatarsal ligament injuries, arch pain, plantar fasciitis, periostitis, posterior tibial tendonitis, achilles tendonitis.

Sports Medicine Knee Injuries: The Use of Orthotics, Michael F. Dillingham, M.D. and Gary W. Prout, C.O., 3250 Alpine Road, Portola Valley, CA 94025.

Indications for prophylactic bracing in sports, as well as post-injury and post-surgical bracing will be discussed. Factors influencing brace acceptance and availability will also be reviewed. Factors influencing either physician acceptance of bracing or physician willingness to bypass the certified orthotist will also be reviewed. These will include the quality of bracing, availability, and quality of service and financial incentives to the physician and/or orthotists that may interfere with traditional referral patterns. Basic varieties of braces used in sports injuries and their appropriateness will also be discussed for issues ranging from ligament damage to soft tissue inflammation.

Bracing in Sports, Lyle J. Micheli, M.D., 319 Longwood Avenue, Boston, MA 02115.

Sports bracing has a number of very different objectives, depending on the specific problem being addressed, and the demands which the athlete and sport will place on the apportioners. Braces may be used for injury prevention; protection of a joint after injury; to limit motion of a ligamentously unstable joint; or to allow continued play while on injury or disorder in healing.

The use of preventive bracing has taken on additional importance in contact sports such as gridiron football—particularly for the knees. Each anatomic site—spine, upper extremity, and lower extremity—will be reviewed with discussion of braces used at each site for the four functions indicated.

A Biomechanical Study of the Static Stabilizing Effect of Knee Braces Used for Medial Stability, Edward P. Van Hanswyk, C.O., Clinical Instructor, State University of New York, Bruce Baker, M.D., Associate Professor, Orthotic Surgery, S. Bogosian,

M.D., Resident, Orthotic Surgery, Fred Werner, Dennis Murphy, B.S., Technical Specialist, Orthotic Surgery, State University Hospital, 750 East Adams Street, Syracuse, NY 13210.

Disruption of the medial supporting structures of the knee occurs commonly in contact sports such as American football. Return to competition following treatment and rehabilitation is frequently enhanced by orthoses, particularly in those patients with some residual laxity. Current advertising and media coverage in the U.S. not only promotes bracing following injury, but infers that a significant prophylactic effect can be achieved by bracing prior to injury in high risk situations. The purpose of this project was to determine if commercially available bracing could be shown to produce objective evidence of medial stabilization of the knee. Commercially available athletic braces were evaluated for their effect on abduction forces applied to a cadaver knee with no instability and with experimentally created medial instability. Under computer control, abduction forces were applied while simultaneous data was obtained from a three plane electrogoniometer and transducers applied to the anterior cruciate ligament and the superficial medial collateral ligament at 15–45° of flexion and 1–15° of external rotation. Our results showed a range of reduction in medial collateral ligament stress of up to 45 percent with various commercially available orthoses.

The Effects of Bracing on Selected Movements Performed by Skilled Athletes, Michael R. Farmer, R.P.T., A.T.C., Jack L. Groppe, Ph.D., In-Sik Shin, M.A., 118 Cypress, Lees Summit, MO 64063.

This study investigated the effects of bracing on selected movements in the athlete. Subjects were eight athletes, six suffering previous knee injury with surgical repair and two with no history of knee trauma. Tibial rotation was measured with and without the Lenox Hill Brace using a rotating disc attached to the subject's foot.

Subjects were measured in the sitting, loading position. Two high speed cameras (set at 100 frames/sec) analyzed subjects while sprinting and performing cutting maneuvers, with and without the knee brace. An AMTI force platform measured ground reaction forces during these maneuvers.

Tibial rotation was reduced in all cases with the use of the brace, with a mean reduction of 14.4 ± 2.68 . Results of high speed cinematography demonstrated faster acceleration and horizontal velocity during sprinting and reduced deceleration required for completion of cutting maneuvers in the braced lower extremity. In all cases but one, the vertical ground force (as measured by AMTI force platform) was less in the braced condition, indicating that the subject's injured leg exerted (and encountered) less vertical force when contacted with the ground.

The authors concluded that the brace provided favorable support for the athlete as well as enhanced movement. The individuals moved faster, and encountered less force to the braced lower extremity.

Functional Requirements of Preventative Knee Orthoses, David J. Hoy, C.P.O., Hans J. Georg, R.A. (O.P.), James N. Tilton, R.T. (O.P.), 240 Marion Avenue, Mansfield, OH 44903.

Greater emphasis is currently being placed upon the concept of providing preventative orthotic protection to the knee in sports activity. Critical evaluation of this concept reveals a need for clear guidelines centering upon orthotic design features and biomechanical/clinical data. This presentation will explore the current modes of mechanical stabilization and review recent studies done to determine the present levels of efficacy in protecting the vulnerable structures of the knee. Mechanism of injury and magnitude of disruptive forces will also be examined. A new orthotic concept designed to provide prophylactic knee protection will be presented and discussed.

Orthotics in Sports Medicine, Michael D. Brncick, C.P.O., 809 Kurt Lane, Crete, IL 60417.

No abstract available.

A Canadian Approach to Custom Footwear, Colin Campbell, C.O.(C), 2075 Bayview Avenue, Toronto, Ontario, Canada M4N 3M5.

The challenge of balancing the need for function and cosmetic acceptability in custom footwear will be discussed. A case presentation of a difficult footwear management problem will highlight the options available to the practicing orthotist for this type of patient.

The Sunnybrook Aids-for-Living Centre possesses a Custom Footwear Manufacturing Programme which provides a comprehensive clinical component along with central fabrication on a local and national scale. The structure and capabilities of the programme will be reviewed.

The growing need for training of footwear specialists and shoemakers will be examined. An overview of educational programmes in existence throughout the world will be presented to reinforce the critical need to revive a dying trade.

Suggestions for training programmes and the creation of professional standards will be offered.

The Non-Manageable Meningomyelocele Patient—An Alternative Approach, David P. Roye, M.D., Assistant Professor of Orthopaedic Surgery, College of Physicians and Surgeons, Columbia University, and Glenn F. Hutnick, C.P., Clinical Instructor, Department of Rehabilitation Medicine, College of Physicians and Surgeons, Columbia University.

Orthotic management of the meningomyelocele patient is a widely discussed topic. The areas of discussion usually include knee ankle foot orthotics, standing frames, and reciprocating orthoses. How-

ever, there are many orthopedic problems that contradict the application of these devices. The problems include flexion contractures, angular deformities, and abnormal range of motion. Prior to fitting, surgical intervention is usually the rule. This paper is an attempt to discuss an orthotic design for these patients who demonstrate these problems, but are not surgical candidates. The orthosis is a plastic thoracolumbar-hip-knee-ankle-foot orthosis that is utilized for both static and dynamic functions. Fabrication, fitting, and final delivery of the device will also be discussed. We hope to demonstrate how a larger population of patients can now be managed.

The Impact and Shock to the Lower Extremities, Including the Foot, Ankle, Knee, Hip and Back, *M.R. Davidson, D.P.M., D.A.B.P.S., 11647 Aliento Court, San Diego, CA 92127.*

The paper deals with the author's experience in dealing with shock to the lower extremities, which include conditions caused by shock to the heel, specifically apophysitis in children, heel spurs, heel neuroma in adults, heel fasciitis, degenerative types of arthritis in adults, including degenerative ankle and knee arthritis, shinsplints, muscle pulls and tendonitis. The author examines the most common cause of lower extremity pain in the child and adult, which is the shock of walking on unyielding surfaces like cement and asphalt, on which the modern Homosapien spends 90 percent of his time. The author demonstrates cinemagraphically the components of heel strike and the shock wave generated into the lower extremities, a most dramatic visualization for those involved in lower extremity medicine. The author also offers some mechanical devices and aids to relieve the painful conditions mentioned above, to avoid the degenerative changes caused by this remarkable shock wave generated through the lower extremity in heel strike.

Components for the Fabrication of Prototype BK Prostheses and Development of a BK Ultra Light Fabrication System, *Carlton E. Fillauer, C.P.O., Durr-Fillauer Medical, Inc., Orthopedic Division, P.O. Box 5189, Chattanooga, TN 37406.*

A prototype prosthesis is a transparent check socket mounted on a dynamic alignment unit so that the patient can walk on the assemblage. Use of such a device allows the prosthetist to check the fit of the socket under dynamic conditions and define the proper fit and alignment of the prosthesis as a whole prior to the fabrication of the actual prosthesis. This has important implications. The development of an integrated system features Durr-Plex check sockets. Hardware for coupling them to various alignment units will be described. Further, one of the possible alternatives the technique makes possible, an ultralight BK prosthesis, will also be described.

Replant Surgery: Its Effect on Prosthetics Practice in the 1980's, *David W. Vaughn, C.P.O., James A. Nunley, M.D., P.O. Box 6123, Kingsport, TN 37663.*

This paper will cover criteria for replant, for amputation, for immediate fit, for amputation as optimal treatment for injuries that can be treated with either questionable replant management and a great deal of time, or with the more immediate rehabilitation aspects afforded by amputation and immediate postoperative prostheses. We will deal primarily with the lower limb, where replant surgery in the upper limb is generally the preferred treatment, if feasible. In the lower limb, reconstructive amputation surgical techniques generally are indicated, advised, and implemented.

The ICEPOSS System, *Össur Kristinsson, C.P.O., Ossur hf., Hverfisgata 105, Box 5288, 125 Reykjavik, Iceland.*

A new concept for fitting TE, TK and TA (Syme) amputees is presented. ICEPOSS

stands for: Icelandic Pull on Suction Socket. The system consists of an injection moulded silicone socket of 10-15 cm. length and an open, ISNY type frame with a full-ring proximal brim. The silicone socket is secured to the distal cup of the frame by screws or by a specially designed coupling device. The silicone socket fabrication is quite similar to the ICEROSS socket fabrication. The socket is a compressive suction socket and is donned by inserting the residual limb, forcing all the air out. When doffing, the amputee inserts a finger down into the socket and lets air in to break the seal. Three TK, one TE, and two TA amputees are using this type of socket in Iceland.

Soft Tissue Supplement and Flexible Brim Socket Design for the Above the Knee Amputee, Wayne A. Koniuk, C.P., 324 Divisadero Street, San Francisco, CA 94117.

Recently we have developed a technique using a cast ring of pure silicone to encompass the proximal four to six inches of the above knee socket. Each ring is individually manufactured for the patient to assure intimacy of fit. Thickness, shape, and duramater of the pure silicone can be precisely controlled without the often unwanted results created by vacuum laminating techniques, i.e., thinning over prominent areas. The control of pure silicone allowed some impressive possibilities: 1) thickening of the ischial seat to provide weight bearing comfort, 2) lowering of the anterior and medial walls to provide a truly elastic and flexible brim without the sharp edges commonly found using thin thermoplastics, and 3) torque absorption characteristics of the silicone are maximized because no base material (i.e., Dacron, nylon) is used in manufacture. The characteristics of pure silicone allow for improvements and address most of the problems found in the traditional quad socket design. The pure silicone ring may be used in combination with any of the new fitting techniques, including CAT-CAM and ISNY.

Feasibility of Improvement in Body-Powered Arm Prosthesis, Maurice A. LeBlanc, M.S.M.E., C.P., Rehabilitation Engineering Center, Children's Hospital at Stanford, 520 Willow Road, Palo Alto, CA 94304.

Standard body-powered upper-limb prostheses have not changed significantly since the 1950's. They still employ aircraft technology using shoulder harnesses and steel cables for operation. Work is being undertaken to assess the feasibility of improvement in these prostheses. A survey of arm amputees and professionals has been conducted, which shows that function is clearly the most important feature for users, and uncomfortable harness and poor appearance are the most negative features. Testing of various force transmission systems has been completed which shows that a hydraulic system has some promise of providing higher efficiencies, reducing the forces on the harness, and allowing the control system to be buried in the prosthesis for better cosmesis.

Interviewing the Amputee: A Step Toward Rehabilitation, Dee Malchow, R.N., Orthopaedic Department, Harborview Medical Center, 325 Ninth Avenue, Seattle, WA 98104.

The impact of an amputation will affect every aspect of a person's life. Those who work closely with the amputee will better understand the perspective of this individual with a thorough, well-conducted interview as illustrated in the format we have utilized. This will provide valuable insight into the areas of their life which are being affected most. It also serves as a key in establishing a positive rapport. The prosthetist, or other health care professional, who invests the time to identify the amputee's needs and concerns, demonstrates the sensitivity and caring which is greatly appreciated by the person as they attempt to adjust to the loss they have experienced.

Interviewing the Amputee: A Step Toward Rehabilitation, James D. Clark, Ph.D., The Clark Group, 5256 17th N.E., Seattle, WA 98105.

There is a need for better understanding and support for the amputee during this most severe of orthopaedic traumas. Given the wide range of emotional, psychological, and social problems inherent in the amputee's reaction to loss of a limb, it is important that orthotists and prosthetists recognize how much their own sensitivity to these problems is a crucial part of the care they provide.

Too often, orthotists and prosthetists avoid discussion about psychosocial adjustment issues with their patients. As a result, considerable guesswork is required to determine if the appliances that patients receive will actually be used by them. However, by skillfully interviewing patients about treatment issues that include psychosocial concerns, considerable time and energy can be saved by ensuring that the products given patients actually match their lifestyle needs.

The "Orthotic Arm": A Case Report, 1985 Article of the Year Award Winner from *Orthotics and Prosthetics*; William D. Nancekivell, B.Ed., C.O.(C), Chedoke-McMaster Hospital, P.O. Box 2000, Station 'A', Hamilton, Ontario, Canada L8N 3Z5.

Capitalizing on the Changing Orthotic and Prosthetic Marketplace, Walter L. Racette, C.P.O., Vice President, Professional Services, Orthomedics, Inc., 2950 East Imperial Highway, Brea, CA 92621.

The changing medical consciousness has left many questions for the orthotic and prosthetic professional. This paper will discuss the potential availability of new markets for the profession as well as suggesting some necessary changes we will need to make to capture our share of the market. The paper will discuss the impact of prefabricating, the impact of other

paramedicals doing orthotic/prosthetic care, and address the question of professional business compromise needed to make an impact.

Stress in the Medical Profession, Dr. Norman Spencer, 1963 Turk, San Francisco, CA 94115.

No abstract available.

Alcoholism: The Family Disease, Carol A. Clayton, Community Presbyterian Counseling Center, 222 West El Pintado Road, Danville, CA 94526.

Alcoholism affects approximately one out of 10 persons in the United States. That person in turn affects the lives of an average of four other people—relatives, employers, and friends. The difference between an alcohol abuser and an alcoholic is that an abuser, or problem drinker, knows that drinking causes problems in his personal relationships, job, etc., and he is able to stop the drinking when he sees the consequences. The alcoholic, on the other hand, will continue to drink regardless of the consequences and has great difficulty stopping. In order to cope with this devastating disease, family members take on certain survival roles: enabler, hero, scapegoat, mascot, and lost child. The person most affected is the spouse, called the co-alcoholic, or the enabler. As the disease progresses, the co-alcoholic's behavior changes drastically. While the alcoholic is in denial about his problem with drinking, the co-alcoholic is becoming more fearful, resentful, helpless, and preoccupied with the alcoholic's drinking. Both partners exhibit depression as well as physical and emotional deterioration. The spiraling destruction can be reversed once the family begins treatment and the alcoholic is motivated to abstain from drinking.

Alcoholism: The Impact on the Corporation, William B. Smith, C.O., Knit-Rite,

Inc., 2020 Grand Avenue, P.O. Box 208,
Kansas City, MO 64141.

No abstract available.

Burnout in Orthotics and Prosthetics, Joseph Wanchik, C.O., O.T.R., Rehabilitation Institute, Inc., 261 Mack Blvd., Detroit, MI 48201.

The orthotist/prosthetist is a care-giver who spends a significant amount of time dealing with the physical and emotional problems of his clients. The results of his

work must not only satisfy the client, but also the rehabilitation team, third-party insurance carriers, and governmental agencies. This intensity of involvement and the stress produced in providing quality orthotic/prosthetic service can lead to burnout. This condition is contrary to genuine caring commitment, creativity, and enthusiasm normally displayed by members of this profession. This paper will include a discussion of the symptoms of burnout, the factors leading to it, and some methods of coping with this condition.