

Advocacy and Support Liaison Officer

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Have you or your partner had difficulty in dealing with Government red tape or finding the right services for your needs? I have, and I remember how frustrated and angry I got.

Our Committee has expanded my advocacy role and I have happily accepted the extra duties.

With the help of the Committee and all the resources of the Network I hopefully will be able to assist any members of our Network through potential hardship or anguish. We all imagine our problems are unique but since my involvement with PPN I have found we share many of the same challenges and experiences.

I can't promise we will be able to solve all your problems but at least you won't be alone in your struggle. Even if you just need someone to talk to in times of sorrow or isolation please write or phone me. Without question your privacy and confidentiality will always be observed.

If you know a member who is ill or in hospital and would like a cheerio message, or sympathy in the case of a personal loss, please let me know so we can show them that they are in our thoughts.

Please don't forget, you are not alone, we are here to support you and your family in your hour of need, that is what we at the Network are here for.



Polio and Bracing

Steve R Hall MA CO (SHall79115@aol.com) Hangar Orthotics, Tucson, Arizona

As I was putting this Network News together, the latest issue of PPASS News (Vol. 18, No. 3, May/June 2003), published by the Post Polio Awareness & Support Society of British Columbia, containing this article arrived. As it was so relevant to other reports in this Network News I immediately sought permission to publish excerpts and am very grateful to receive so promptly permission to reprint.

Advancements in the area of polio bracing have been made, but they have been evolutionary, not revolutionary. The most readily apparent advancement has been in the use of lightweight materials like aluminium and polymers (plastic). Lighter weight braces have been a real boon to patients who suffered hip and back pain from lugging around heavy steel braces. Lighter weight braces also cause less fatigue. This is an especially important consideration for patients feeling the debilitating effects of post-polio syndrome.

The ability of an orthotist to understand the pathomechanics of a patient's gait and design a brace tailored to the need has freed many patients from the same old heavy steel brace attached to the shoe that they've always had. In light of these advancements, how can a patient be sure that their brace is still right for them? Is there something better, such as a different style or material?

The first key to bracing satisfaction is to have a strong relationship with a skilled, certified orthotist. Polio bracing is one of the biggest challenges an orthotist can face. The flaccid paralysis associated with the polio means the patient typically leans heavily into the brace and large, possibly painful forces are generated. The pathomechanics of the polio patient are complex. Polio patients are relatively few in number in some communities and it can be difficult to see enough of it to become skilled. A patient needs to question the orthotist regarding the amount of specific polio experience and levels of certification and training in order to be certain they are in good hands. Patience can be a critical part of this relationship. Oftentimes when trying something new, there will be a period of trial and error while the new brace is "dialed in" and the patient becomes used to the new style or material. Open and honest communication between the patient and the orthotist can be critical.

Another key to bracing satisfaction is to have realistic expectations of what can be accomplished. Some polio patients have been wearing the same style of brace for thirty years and more. Change can be difficult. Even though, "according to the book", a new style may be appropriate, adapting to it can be an unmanageable hurdle. Still, you never know until you try.

Report on March Seminar – Advances in Orthotics

Wendy Chaff

We are very grateful to Wendy Chaff, Convener of the Network's Hunter Area Support Group, for the time and effort she put into this comprehensive report of our recent Seminar on Orthotics.

On Saturday 1 March 2003 at the Northcott Society in Parramatta, a panel of three Orthotists - Derek Lee, Richard Dyson-Holland and Mark Raabe - discussed their particular areas of expertise with regard to the prescribing and fabrication of orthotics, and the different materials available. This summary of their presentations may interest those who could not be there to benefit first-hand from the knowledge shared by our guest speakers, who demonstrated a wide selection of orthotics and made us aware of so many new options now available, their benefits, drawbacks and costs.

First, a few definitions from the ever-handy medical dictionary:

Orthotist: "Designs, fabricates and fits braces or other orthopaedic appliances".

Orthosis: "A force system designed to control, correct or compensate for a bone deformity, deforming forces, or forces absent from the body. Orthosis often involves the use of special braces".

Orthotic: "The design and use of external appliances to support a paralysed muscle, promote a specific motion, or correct a musculoskeletal deformity".

Podiatrist: "Diagnoses and treats disorders of the feet".

Derek Lee : Introduction to Orthotics

Our first speaker was Derek Lee, Orthotist at Northcott Equipment Services, North Parramatta, since 1997. He sees many polio clients and is familiar with the unique challenges they offer.

We learned that an Orthotist such as Derek is a health care professional who is responsible for the provision of orthoses for people with neuro-musculoskeletal disorders. He proceeded to explain the concept and function of the different types of orthoses – the correct term for a splint, brace or appliance designed for and fitted to the body – and demonstrated the various types.

Stabilising or Supportive Orthoses: to stabilise joints by preventing unwanted motion and stabilising limbs for weight bearing, for example, callipers.

Motorised or Functional Orthoses: with a motor element designed to improve active function to an otherwise paralysed limb segment, eg a dorsiflexion ankle-foot orthosis to assist the foot to clear the floor.

Corrective Orthoses: to correct deformity or realign parts of a limb, eg a spinal brace for scoliosis.

Protective Orthoses: to protect or provide alignment of an injured limb – upper or lower – but more often related to lower limbs.

Shoe Modifications and Foot Orthoses: to accommodate fixed deformity of an ankle joint and foot to improve balance on standing and walking; relieve pain; compensate for leg length discrepancy.

Ankle-Foot Orthoses [AFO]: control alignment and motion of the joints of the foot and ankle; provide dorsiflexion assistance during the swing phase.

Knee Orthoses: provide mediolateral and anterior-posterior support of the knee.

Knee-Ankle-Foot Orthoses [KAFO]: provide flexion, extension and mediolateral stabilisation of the knee; may provide free or locked knee motion, or adjustable range of motion.

Hip-Knee-Ankle-Foot Orthoses: provide selective hip joint assistance past the thigh.

Conventional Knee-Ankle-Foot Orthoses: made of metal and leather – quite heavy; may need to be attached to modified shoes. A calliper can clip onto the heel of a shoe.

Thermoplastic KAFO: generally lighter and more cosmetic, with flexibility in design, compared to metal, however, can get very hot in summer. Some people have made holes in the plastic to relieve sweating, but talk to your Orthotist before attempting this, as the strength of the plastic may be affected. This type of orthosis can be used in factory-made shoes, but only if there is not any marked foot deformity.

Proteor Carbon-Fibre KAFO: made of carbon-fibre, except for the knee and ankle joints – ultra light weight and of superior strength. However, carbon fibre can be brittle and is not advised for anyone weighing over 75 kg. In addition, while one third lighter than plastic, its cost is double that of plastic.

Derek said that Northcott have used computer analysis – a walk-over pad – for nearly three years to analyse gait patterns. He estimated that orthotic insoles would comprise about 70% of his work.

For country clients, the Northcott Society conducts regular Mobile Orthotic Clinics, with Derek Lee travelling around NSW for one-day-a-month clinics at Coffs Harbour, Dubbo, Newcastle, Port Kembla, Tamworth and Wagga Wagga.

[Enquiries: 1800 506 071 or (02) 9890 0100, www.northcott.com.au, Fax: (02) 9683 2827]

Richard Dyson-Holland : Innovations in Orthotics

Our second speaker was Richard Dyson-Holland, Orthotics Program Co-ordinator for Otto Bock Healthcare, Baulkham Hills. Otto Bock is the world's largest manufacturer of prosthetic and orthotic components, and develops high-tech materials, electrical and mechanical designs for the industry.

Richard told us that some constraints exist in the types of orthotics made today for the treatment of physical impairment from Post-Polio Sequelae – mainly to restrict undesired motion, relieve pain, compensate for lost muscles and enable ambulation. The failings of many current orthotic designs tend to be: fairly heavy, thick walls (shoe fitting issue), rather visible, may restrict desired movement, and need more control.

However, there are professional design concepts and possibilities worth investigating. Richard enlightened us about the opportunities that innovations in orthotics offer over currently available solutions for specific needs, and showed various examples.

What makes a good orthosis?

On appropriate application of force, does it do what it is designed to do?

An orthosis should not be overly restrictive, abrasive or heavy.

Typically, good function, good fit and increased freedom is desirable at the expense of adding more weight. Types of materials are just one aspect of what makes up a good orthosis. More important than weight is good fit. It all goes back to the talent of the Orthotist, really.

Orthotic Material Options

We must remember the governing rule - all materials have pros and cons - no material is perfect. Keeping this in mind, *structural materials* (which give the orthotic its strength) include steel, aluminium, titanium, fibre composite, and plastics. *Interface materials* (between the orthotic and our skin) include leather, synthetic substitutes, oxygen and nitrogen blown foams, and fibreglass.

Titanium is as strong as steel, but much lighter – 700 grams for uprights, compared to 1,200 grams for stainless steel uprights – however, it is far more brittle. Although titanium lasts a very long time, it is three times the cost of other materials, which means it is not used as much.

Laminated Orthoses

Plastic shells weigh less than the metal and leather designs. Laminates weigh less again. In composites of plastic resins and reinforcement fibres of glass or carbon, the resin goes hard, and strength is determined by shell design, fibre direction, fibre type and quantity.

Pre-impregnated Carbon Composites

Resin is embedded in the fibres and frozen. When thawed, layed-up, heat and vacuum is applied for several hours. The result is ultra thin and ultra lightweight. To give an idea of achievable lightness in a KAFO – all the structural components could weigh less than the leather padding! Such fabrication processes are extremely time consuming and consequently more expensive – may be up to 4 to 5 times the average cost.

[Enquiries: 1300 136 056, www.ottobock.com.au, Fax: 1300 557 676]

Mark Raabe : Advancements in Orthotic Management

Our final presenter was Mark Raabe, Orthotist/Prosthetist of OrthoSynergy Pty Ltd at Taren Point.

Mark, a Graduate of Melbourne University, has worked in Sydney for 15 years – with Reis at Lidcombe for 2 years, Otto Bock for 10 years, and now his own company, OrthoSynergy, for the last 3 years. He has recently taken on the role of orthotist at the St George Orthotic Clinic and reports he is seeing many polio clients there. Mark's presentation focussed on giving us an idea of what could happen in the future in prosthetics and orthotics, illustrated with many samples.

There has been a prosthetic bias with research, for about 50 years, until just recently. There is no longer any orthotic stagnation, as we have had recent advances in orthotic materials, techniques and components. Designers can now “think outside the square” for less common problems.

Materials

Conventional materials – stainless steel, aluminium and leather lining – have now progressed to thermoplastic material offering total contact which is good for control. We heard about the virtues of pre-impregnated carbon fibre, which is very light and has many advantages, but is not for everyone.

Techniques

Appropriate techniques are reliant upon materials and components, orthotic management efficacy, the client's mobility, and the aesthetic result desired. You need to consult an Orthotist to see what may be suitable for your condition. There are new techniques allowed by advances in materials – for example, articulated AFO, GRAFO, KAFO shell design.

Advances in knee control

As Dr Bruno recently wrote (*Post-Polio Forum*, March 2003): “There are now two types of KAFO knee joints. The old familiar joint with drop-locks or a spring-loaded latch prevents the knee from bending when you stand or walk. A newer development, the offset joint, can be used by those who have some strength in their quadriceps and whose knees bend backward at least a little. The offset joint doesn't lock, but it still prevents the knee from bending when your leg is straight. With the offset joint you can swing your leg normally when you walk but be secure when you're standing.”

The **Load Response Knee** allows for knee flexion during the stance phase which is both energy saving and shock absorbing. At weight acceptance there is 18° of flexion which absorbs shock and maintains progression through the step.

The **Stance/Swing Knee** gives stability whilst weight bearing yet freedom to swing the knee. However, it is not suitable for people with hyperextension, and there are weight restrictions – Otto Bock have 80 kg and 120 kg versions.

All orthoses need to be made and aligned to suit an individual. Some people may want the Orthotist to make a trial version or a generic set up to see and try. The flexion knee has been very well tested in Europe for about 5 years. The problem is to get the gait cycle as normal as possible. However, you can't expect to adjust your walking style to effectively use such an orthosis immediately – you have to learn to walk again, and will need help from a very good physiotherapist familiar with gait corrections.

The **Intelligent Knee** is another exciting innovation which features electromagnetic knee control combined with foot-plate sensors. New types are being developed with pressure sensitive pads to release the knee where there is pressure on the foot. This is an intuitive system which gives a safer gait. Stumble control, so you will not fall, is something to look forward to in the future. New technology can enable so many advancements in orthotics.

[*Ed. See the articles on pages 9 and 10 for pictures and more information on these innovations.*]

Mark's advice is to examine suitable options and ask for the best you can afford, within your price range (but note that the most advanced innovations can cost up to \$10,000 - or even more).

[**Enquiries:** OrthoSynergy – Phone: (02) 9526 8066, Fax: (02) 9526 2507]

Question & Answer Session

Just a few of the many questions put to the Panel are briefly summarised below.

Why do so many people have problems with their feet? Common problems are due to people walking on harder ground than we were intended to, pushing ourselves harder and longer. It extends up from the foot, as misalignment can affect ankle, knee joint, to hip, back and neck. People who are on their feet on hard surfaces tend to walk on balls and heels, leading to a good chance of developing fallen arches. Probably most of the population would benefit from having custom-made shoes, but can make do with factory made shoes, as long as they are well fitted, or modified.

To see an orthotist or podiatrist, shoe maker, and so on, we are referred from one to another, in different places. Wouldn't it be ideal to have clinical teams combining towards a common goal on the same premises? Regrettably, this is not encouraged by the structure of the NSW health system. The lines of communication between health professionals dealing with related problems need to be kept open.

What does an orthosis cost and can I get help to pay for it? Depending on your needs, and the materials and technology used, the cost varies widely. You may wish to ask for an estimate beforehand. Most health funds with auxiliary benefits will refund a certain amount. The Program of Appliances for Disabled People (PADP) which is administered by the Department of Health exists “to assist eligible residents of NSW who have a life-long or long-term disability to live and participate within their community by the provision of appropriate equipment, aids and appliances”. While this means that virtually all our members are eligible, there is always more demand than the funds to satisfy it. As a result, there are priorities for the provision of equipment depending on income. However, do not let this stop you from applying – the need for additional funding in the Program can only be assessed by the numbers of people applying and the degree that needs are not being met. (For further information on accessing PADP, please contact the Network.)

Do I need a referral? Usually people come to see an Orthotist if they are in pain or cannot walk properly. An Orthotist normally prefers you to have a referral from a health professional to help assess your problems. They need more information for complicated conditions. Within the profession there is a difference in how an Orthotist and a Podiatrist would treat a patient, so it depends on the referral by an Orthopaedic Surgeon or Physiotherapist, more often than by a GP. Many practitioners do not fully understand the capabilities of these new technologies – it comes down to their experience. It is a good idea to *always seek* a second opinion, whether satisfied or not. It is also advisable to ask around for recommendations from other patients satisfied with their treatment for a similar condition.

What is the main difference between Orthotists and Podiatrists? “Theoretical”. In Australia most have been trained in the same facility in Melbourne, attending many of the same classes. Just recently a course has been established at the University of NSW. Podiatrists are a much bigger group, and more widely publicised.

What about maintenance? If you have had the same orthosis for years it may require attention – so get a review every couple of years, to have it refurbished or replaced. Don't wait beyond 5 years for a check up, for safety's sake.

Can a long-existing problem be corrected? This may require a treatment program, which could consist of a first set of orthoses and then gradual progress to another level, requiring different aids – each step can involve big adjustments.

What if my orthosis is useless? Sometimes a patient has tried an orthosis and will reject or discard it as being uncomfortable, too rigid or difficult to use. It won't do you any good put away in a cupboard. Go back for further help or adjustment. However, you need to bear in mind some cautionary words from Dr Bruno “Braces are designed to support a weak leg, not to fix mechanical problems like recurvatum (“back knee”). Many braces hurt too much to wear because they were intended to “fix” recurvatum or to straighten a foot that has turned outward for 40 years. All braces should be designed to fit your leg just as it is, not to make it look the way other people's legs do.” (*Post-Polio Forum*, March 2003). Having said this, you need an outlay in effort as well as financially. Persevere! Keep on seeking for a solution to your problem – it could be within your reach now, more than ever before!

The sixty Network members present were appreciative of the major combined effort by the three Orthotists – Derek Lee, Richard Dyson-Holland and Mark Raabe – to raise our awareness and guide us through a virtual smorgasbord of possible options worth investigating.

In grateful thanks for giving up their Saturday, the Network presented each speaker with a finely-crafted pen, hand-made from Australian timber.

Bracing Options: Shadow Bracing System

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Kyle Scott, CO, a certified orthotist for over 15 years, has been confronted with the same question from hundreds of polio survivors – “Where’s the new technology in orthotics?”

“I find everyone wants to see the newest gizmos, but really wants someone else to try them”, says Scott. In his experience, polio survivors fall into three main orthotic groups: those who have worn braces since contracting polio; survivors who wore braces after the acute disease, but who learned compensation techniques to overcome their weaknesses and, in turn, discontinued wearing braces; and those who had a less severe case of polio or those who had a full return to function and never had to wear braces, but now are experiencing new weakness.

Each group now has unique needs, both physically and psychologically, and each polio survivor’s needs must be addressed individually.

Metal and leather (M&L) braces were the primary orthotic treatment in the early years. “My polio patients who wear M&L braces have a love/hate relationship with them”, Scott reports. “They love the comfort, durability, and very positive structural support, but hate the excessive weight, bulk, and odor that is sometimes associated with the leather, and the limited footwear choices, as the M&L braces have to be attached to the outside of the shoe”.

With the development of thermoplastics over the past 20 years, the orthotics and prosthetics industry responded to these complaints with the next advancement in orthotics. Thermoplastic braces are lighter, less bulky, washable, more appealing, and fit inside shoes, so polio survivors can wear different styles of shoes.

Scott continues, “However, experience has taught orthotists that all thermoplastics have an elastic property to them, so even when the brace looked to be structurally equal to M&L, the plastic material couldn’t duplicate the structural support of metal”.

Scott pondered his patients’ comments that they didn’t feel their brace was as supportive, would bend under their body weight, and that their brace had a “rubbery feel.” What material could be used that would be structurally as strong as metal, but lightweight, less bulky, and fit into shoes as easily as the plastic braces do?

After joining Oregon Orthotic System, the industry leader in laminated orthotic braces, in 1990 Scott realized that lamination provided all the benefits of M&L combined with all of the benefits of thermoplastic.

The Shadow Bracing System combines time-tested (M&L) engineering, with today’s cutting edge carbon-graphite lamination technology to keep it lightweight. Stainless steel knee and ankle joints are standard, with titanium ankle joints a popular option. A standard long leg brace with stainless steel components weighs between 2.75 and 3 pounds, while a short leg brace can weigh as little as a pound when titanium components are used.

Oregon Orthotic System, based in Albany, Oregon, knows no bracing system can meet every need, but offers the Shadow Bracing System as newer technology that can address many of the concerns of polio survivors.

Pictured right. Any trim configuration is possible as long as the brace is structurally sound. Almost any colour or skin tone can be reproduced and personalised fabrics (Spandex™) can also be laminated into the brace.

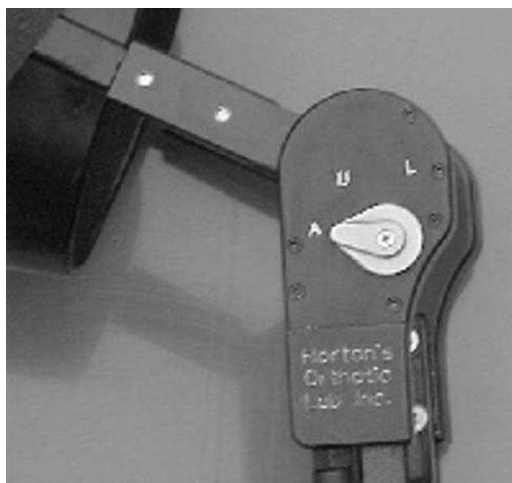


The Stance Control Orthotic Knee™

Reprinted from Polio Network News, Volume 19, Number 1, with permission of Gazette International Networking Institute (www.post-polio.org). Any further reproduction must have permission from the copyright holder. Visit Horton Technology's website at www.stancecontrol.com for more information about the exciting developments in orthotics described in this article.

The mechanically-actuated Stance Control Orthotic Knee™ joint is the latest innovation from Horton Technology, a private laboratory headquartered in Little Rock, Arkansas. Horton's knee joints have been incorporated into custom-made leg braces and can prevent the knee from collapsing as polio survivors walk, automatically releasing to permit unimpeded knee flexing during the swing phase of gait.

Right: Stance Control Orthotic Knee™ Joint



Preliminary scientific studies from the University of Central Arkansas (UCA) suggest that these braces provide a more normal gait pattern and reduce the effort required for people with lower limb weakness and paralysis to walk.

The mechanically-actuated version has been commercially available since January 2002. More than 400 orthotists in North America have successfully completed the advanced training course in the application of this innovative rehabilitation technology.

Left: Stance Control KAFO

At the annual meeting of the American Orthotic & Prosthetic Association (www.aopanet.org) in the fall of last year, Horton Technology Inc. unveiled an electronic version of the Stance Control Orthotic Knee™ joint. Polio survivor Paul Ellis demonstrated how the Smart Knee™, which can be powered for several days by ordinary AA batteries, enables him to walk safely up and down ramps despite knee muscle paralysis and weakness in both legs.

Horton's electronic Smart Knee™ is currently undergoing final clinical trials in the United States and will be commercially available there in early 2003.

Right: Smart Knee™

