THE WINSTON CHURCHILL MEMORIAL TRUST OF AUSTRALIA

Report by - EMMA CATHERINE BINNS - 2002 Churchill Fellow

THE PETER MITCHELL CHURCHILL FELLOWSHIP
to study the latest developments in hand rehabilitation overseas

The Ice Hotel, Sweden

INDEX PAGE

Introduction

This report details the findings from a 2002 Churchill Fellowship visit to the USA and Sweden to study hand rehabilitation.

The fellowship enabled me to have a 'once in a lifetime' experience! I attended the world-renowned Philadelphia Hand Meeting and visited the largest hand trauma clinic in Sweden. I had the opportunity to visit many hand clinics in America and Sweden learning from highly skilled hand therapists. The combination of attending a world-renowned conference and obtaining clinical experience, allowed me to obtain knowledge about the latest developments in hand therapy and also gain excellent practical experience.

Before proceeding with this report I would like to clarify the term 'hand therapy'. It is the treatment of hand conditions resulting from trauma, disease, or congenital deformity. Hand therapists are either occupational therapists or physiotherapists. Hand therapy includes splinting, edema reduction, sensory assessment and re-training, pain management, wound care, scar management, and functional exercises.

Acknowledgements

I would like to thank The Winston Churchill Memorial Trust for financial and organisational support. More specifically, I would like to thank the late Mr Peter Mitchell for sponsorship of this fellowship. Without this fellowship, the invaluable experiences I have gained would not have been possible.

I would like to thank my referees, who have all had very significant roles in my life;
Ms Judith Wilton, Occupational Therapist
Mr Robert Keall, Retired District Court Judge
Ms Alexandra Retallick, Occupational Therapist

I would also like to thank all of the wonderful people I met on my trip who taught me, inspired me, welcomed me into their homes, and looked after me along the way!

Executive Summary

Contact Details

Emma Binns
BSc(OT), MClSc(HandULRehab)

Hand Works Occupational Therapy
54 Farrington Road
Leeming WA 6149
Western Australia
Telephone (08) 9313 8822
Mobile 0412 645 401
Fax (08) 9313 7445

Fremantle Hospital
Hand Therapy Clinic (B2)
Alma Street
Fremantle 6160
Western Australia
(08) 9431 2314

Project Description

To acquire knowledge and gain practical experience of the most recent world-wide techniques in hand rehabilitation, with the aim of improving treatment quality and increasing the body of knowledge.

Highlights

The highlight of my trip was visiting the Malmo University Hospital, where I was privileged to have a taste of the amazing research that is being conducted on artificial sensibility by Birgitta Rosen and Professor Lundborg, and cold intolerance by Ingela Carlson and Ranghild Cederlund. I was also able to observe the famous Professor Goran Lundborg operate and talk with him. I hope to implement skills that I learnt about sensory assessment and retraining following nerve repair into my clinical practice. I will also endeavour to pass on the exciting information that I have learnt to other hand therapists. Since my return to Australia, Birgitta Rosen has accepted our invitation to be the key note speaker for the Australian Hand Therapy conference in Perth in 2004. This is extremely exciting.

My fellowship provided numerous other excellent experiences and opportunities for learning that will be discussed in the main body of this report. Now that I have returned to Australia, I will endeavour to disperse my newly gained knowledge with my colleagues in the hand therapy community, through participation in professional meetings, research, and student education. I will also incorporate my new skills into my clinical setting, improving hand therapy to many patients.

Programme

Philadelphia, USA
Philadelphia Hand Centre
Dr Lee Osterman (Hand surgeon, Matt Bernstein (Hand surgery fellow), Terri Skirven (OT – Head of therapy at the Philadelphia Hand Centre), Evelyn Mackin (Director of the Hand Rehab Foundation), Janice (OT- Philadelphia Hand Centre), Wendy (PT- Philadelphia Hand Centre), Hand therapy fellows, Judy Colditz (OT – conference presenter), Nancy Callinan (OT, Author Rehab of the Hand), Jodi Seftchick (OT - USA), Susan Bainbridge (PT - UK)

New Jersey, USA
University Orthopaedic Surgeons, Cooper University
807 Haddon Avenue, Haddonfield, NJ 08033
Marianne Spur (OT, Director Hand Therapy Division, Chairperson of the International Affairs Committee of the American Society of Hand Therapists, Treasurer of the International Federation of Societies for Hand Therapy), Tom (OT)

Philadelphia, USA
North Wales Hand Rehabilitation
102 West Walnut Street, North Wales, PA 19454
Lydia Hohman (OT), Kimberly Smith (PT)

Philadelphia, USA
Moss Rehab Outpatient Centre
9892 Bustleton Avenue, Moss Plaza, Philadelphia, PA 19115
Cynthia (Cindy) Kwasniewski (OT Supervisor), Margaret (Marge) Tull (PT), Jackie Templin (Handstand)

Milwaukee, USA
Froedtert Memorial Lutheran Hospital
9200 W. Wisconsin Avenue, Milwaukee, WI 53226-3596
Paula Galaviz (OT), Mary Irzyk (OT) Cecilia Divine, Judy, Gina, Carol, Barb, Diane Keller (OT, Lymphoedema), Dr Daley, Dr Dzweirzynski, Brad Grunert (Psychologist)

Uppsala, Sweden
Department of Hand Surgery, University Hospital
Mistelgatan 1A, 75431, Uppsala
Margareta Persson (OT, President of Swedish Society for Hand Rehabilitation)

Uppsala, Sweden
Clinic Rajan (private practice)
Anita Roos (OT), Mr Rajan (Hand surgeon)

Stockholm, Sweden
Soderhukuset
Annike, Anne-Marie (Ami), Birgitta, Jenny

Malmo, Sweden
Malmo University Hospital
SE-205 02 Malmo, Sweden
Birgitta Rosen (OT, PhD), Professor Goran Lundborg (Hand surgeon), Ingela Carlsson (OT, Head of department of OT), Stefan (Head Physio), Freyja (OT), Dr Nelling (Hand surgeon), Ranghild Cederlund (OT), Christina Jerosch-Herold (OT, Senior Lecturer University of East Anglia, Editor British Journal of Hand Therapy),

Lund
Lund University Hospital
Margaretta (OT), Kirsten (Physio)

Linkoping
Linkoping University Hospital
Gunilla Enstrom (hand therapist)

Main Body

USA

The first week of my trip was spent at the world-renowned Philadelphia Hand Centre. During the first 3 days I attended a Tutorial at the hand centre, spending time with therapists and surgeons. The final 4 days were spent at The Philadelphia Hand Meeting, titled "Surgery and Rehab of the Hand – 2002 – with Emphasis on Arthritis". The emphasis on arthritis was relevant to the Australian population due to the fact that arthritis and other musculoskeletal diseases affect over 5 million Australians.

The Philadelphia Hand Centre is linked to The Hand Rehab Foundation. The Hand Rehab Foundation is a non-profit corporation formed to promote research and education, and disseminate information to physicians and therapists who work with children and adults with hand disorders caused by injury, disease, or present at birth.

Date: **Wednesday 6 March 2002**
Venue: **Philadelphia Hand Centre**
Key people: **Dr Lee Osterman**
Event: **Tutorial - Office Hours**

Breakfast meeting at 6.30am with hand surgeons, fellows and hand therapists. New admissions and complex patients were discussed, with case presentations from the fellows. An interesting new patient was discussed who had been admitted the night before, after falling from a height at a rock concert. He had many fractures, and they were discussing the impact of the height and the added force. They showed some graphic video footage of a teenager skateboarding who fell and broke his wrist. The impact was incredible. I briefly met Terri Skirven, Occupational Therapist, at breakfast.

The day was spent following Dr Osterman in the outpatient clinic, with two other therapists, Sue Bainbridge and Jodi Schiftchik, who were also attending the tutorial. The clinic was very organised, with four rooms in progress. They used a colour-coded system on the doors to identify whether a patient was in the room waiting, whether Dr Osterman was seeing them, or the fellow was seeing them. We left at 8pm and Dr Osterman continued on until midnight!!!

Dr Osterman spent a lot of time with each patient. He has never been sued, and attributes this to the time he spends with his patients. He draws a picture for every patient to describe their condition, the options (option one was always "Live with it"), and the possible complications. He leaves this drawing in the notes to show that he has clearly explained everything. A thorough upper limb assessment was conducted with each patient, including assessment from the scapula to the hand. As Dr Osterman pointed out, in the Winter Olympics that

was on during the previous week there was a difference of only one tenth of a second between first and second. He said that he was continually striving for excellence. Dr Osterman is a man with a lot of energy. He didn't eat, have a drink, or go to the bathroom all day!!!

I saw the famous Dr Schneider in the rooms. He is almost retired, but still does occasional work at the Hand Centre.

Date: **Thursday 7 March 2002**
Venue: **Philadelphia Hand Centre - Haverford Mercy Hospital**
Key people: **Dr A. Lee Osterman and Matt Bernstein**
Event: **Surgery and Office Hours**

I observed several operations performed by Dr Osterman and Dr Bernstein at a small hospital associated with the Philadelphia Hand Centre in the morning, including:

Two open carpal tunnel releases (2 patients). Open releases were chosen due to the severity of CTS, which was very severe in both cases, with no nerve activity detected on EMG. It was interesting to observe the arteries fill (red racing car stripe) a very short time after release, due to the compromised vascularity. A vertical mattress stitch was used to provide a flat scar.

A wrist arthroscope. Pre-operatively the patient's wrist was very lax and she complained of ulnar wrist pain. A small triangulofibrocartilage complex (TFCC) tear and a 90% lunato-triquetral ligament tear were found. The surgeon debrided the area and inserted two pins to hold the lunate and triquetrum together for 4 weeks. A radiofrequency probe was used to tighten / shrink the remaining ligaments.

A wrist arthroscope. A very large TFCC tear was found. Using a probe the surgeon was able to make the TFCC flap around. The TFCC was no longer taut like drum skin. The surgeon debrided the area including the synovitis. The surgeon anticipates that the patient's pain should be reduced significantly. The tear was in the central part of the TFCC, which was unable to be repaired. (The lateral portion of the TFCC can usually be repaired, but the central portion cannot).

Proximal interphalangeal joint (PIP) joint fusion. This surgery was very interesting. The patient was a female physician, who has scleroderma. She was awake throughout the surgery, watching closely, asking questions and making decisions, including choosing the position of joint fusion. A pin was inserted to fuse the PIP joint of right ring finger at 30 degrees. Preoperatively this joint was resting in 80 degrees of flexion, therefore the PIP joint was opened dorsally and debrided prior to fusion. A large portion of bone was cut out. A Herbert's screw was also removed from the distal interphalangeal joint (DIP) joint of her right

middle finger. Her fingernail was loose, and there appeared to be an infection. Therefore Dr Osterman removed the nail and discovered that the screw was emerging from the nail bed. The screw had been insitu for 9 months, and was much simpler to remove than expected.

Removal of two Mucous cysts (2 patients). The cysts were burst and then tracked into the joints to the root, and all of this tissue was removed. The substance in the cysts was joint fluid minus the water, therefore it was a sticky clear jelly-like substance. One cyst was removed from the radial side of the thumb IP joint and the other cyst was removed from the ulnar side of the middle finger DIP joint. Mucous cysts are caused by Osteoarthritis, and are commonly found at the DIP joints. Cysts are removed primarily due to the risk of infection into the joint. Dr Osterman stated that he partially amputates approximately four digits each year due to chronic infections from mucous cysts.

In the afternoon, time was spent observing Dr Osterman and Dr Bernstein in office hours. I had to assess a new patient on my own and then describe my assessment to Dr Osterman. This was challenging, but enjoyable.

Date: **Friday 8 March 2002**
Venue: **Philadelphia Hand Centre – Hand therapy clinic**
Key people: **Janice, Wendy**
Event: **Observing hand therapy**

I spent the day observing occupational therapists and physiotherapists at Therapy City Cental, Philadelphia Hand Centre. I also observed a neurologist conduct an EMG study to assess the status of a person's median nerve, where carpal tunnel syndrome was suspected.

The therapists were busy and worked in a small space. They are ideally situated next to the doctors clinic. Throughout the day there was interaction between the doctors and therapists. Equipment in the clinic was very similar to the equipment in the hand clinics I work in. However there was some additional equipment, including a BTE, Valpar, Mule, Whirlpool, and Fluidotherapy.

One interesting patient was a new patient with Intersection Syndrome. He had a very loud audible creak, which is common in this syndrome. He had only developed the symptoms of pain and creaking within the last few days. A thermoplastic wrist splint was fabricated for trial.

The Philadelphia Hand Centre has 2 hand therapy fellows every 6 months. The fellows receive a stipend (nominal amount of pay) each month. The program appears to be intense, with study based on the Rehab of the Hand text book. The fellows spend one day a month observing surgery, and they are required to present regular case studies to the team. The fellowship would definitely be worthwhile. The two current fellows, from South America and Canada, had

previously had very little experience in hand therapy and were overwhelmingly positive about their experience so far.

In terms of splinting, the splints appeared to be less sophisticated than those that we fabricate in Western Australia. I was surprised to see that they use a very high profile thermoplastic outrigger splint for people after metacarpophalangeal (MCP) joint arthroplasty. This dynamic splint was called an 'aeroplane splint', as the outrigger resembled wings.

More emphasis was placed on work-hardening than in the clinics I have seen in Australia. Patient's often attend work-hardening programs for 2 hours a day three to five times a week, and have to sign contracts regarding productivity, safety, and interpersonal behaviour.

Date: **Saturday 9 March 2002**
Venue: **Philadelphia Hand Centre – Conference**
Key people: **Dr Osterman, Dr Flowers**
Event: **Conference attendance and a workshop on the clinical examination of the wrist.**

The standard of presentation at the conference was excellent. Topics included an overview of common hand problems in Rheumatoid Arthritis, Rheumatoid hand assessment, surgery and therapy protocols following joint replacements.

I attended a workshop that was run by Dr Osterman and Ken Flowers (Physiotherapist and Editor of the American Journal of Hand Therapy). The workshop was based on a paper written by Terri Skirven. The wrist was examined in zones, such as the dorsal ulnar zone. I learnt so much during the workshop and obtained some excellent information. I believe that the specialty of the Philadelphia Hand Centre is wrists.

Date: **Sunday 10 March 2002**
Venue: **Philadelphia Hand Centre – Conference**
Key people: **Dr Stephanie Sweet**
Event: **Conference attendance and a workshop**

The conference continued today. The focus was on Osteoarthritis, including various methods of splinting for CMC joint arthritis and treatment of elbow arthritis. The standard was excellent.

I attended a workshop on fractures with Dr Stephanie Sweet (surgeon). The format was a lecture and discussion with many slides. Optimal management of some interesting cases was discussed between surgeons and therapists.

Date: **Monday 11 March 2002**
Venue: **Philadelphia Hand Centre – Conference**
Key people: **Judy Colditz**
Event: **Conference attendance and workshop on neoprene splinting**

The conference lectures focussed on shoulder osteoarthritis and other rheumatic diseases, such as Scleroderma.

I attended a workshop on Neoprene splinting with Judy Colditz in the afternoon. Judy is a high-profile figure in neoprene splinting in the USA. The workshop was very good. I currently use neoprene splinting in my clinical practice. By attending the workshop I learnt some new splint patterns, for ulnar drift and unstable thumb metacarpophalangeal joints. I also learnt the technique of gluing rather than sewing neoprene, and using heat-activated velcro instead of sewing velcro on. Gluing appears to be a much faster method of construction.

One of the highlights of my time in Philadelphia was meeting Evelyn Mackin, who can be called the founder of hand therapy. She is very elderly (rumoured to be in her eighties)! This evening there was a reception held in honour of Evelyn's recent retirement. I met her at the reception and discussed briefly her career working with Hunter & Schneider. She said that Dr Hunter's mentor had been Dr Bunnell. Dr Hunter was very interested in hands and apparently Dr Schneider also became interested through his contact with these two surgeons.

Date: **Tuesday 12 March 2002**
Venue: **Philadelphia Hand Centre & University Orthopaedic Surgeons, Cooper Health System, Haddonfield, New Jersey.**
Key people: **Roslyn Evans, Marianne Spur**
Event: **Conference attendance and Clinic visit**

In the morning I attended the last session of the conference called 'Classic Hand Topics'. This session provided up-to-date information about treatment of flexor tendon, extensor tendon, nerve compression syndromes, and tendonitis.

Roslyn Evans was a key presenter. Apart from providing updates on protocols following tendon repairs, she presented about Dupytren's Disease. Roslyn's belief is that dynamic splinting should be used post Dupytren's release, rather than the common method of static splinting. I spoke to Roslyn Evans after the conference about the extensor tendon research project being conducted at Fremantle Hospital, and received some very useful tips.

In the afternoon I visited Marianne Spur's clinic in New Jersey. I learnt how to fabricate the dynamic elbow splint (an alternative to turnbuckle splinting) as published in the Journal of Hand Therapy by Marianne. The in-built thermoplastic hinge and the use of the Merit for traction were interesting new techniques.

I collected a series of brochures published by the American Society for Surgery of the Hand. There are many benefits of having hand surgery as a specialty (unlike Australia at present), including this. The brochures contain information on many topics, including replantation, ganglion cysts, and lateral epicondylitis. They are designed as written patient information.

Date: **Wednesday 13 March 2002**
Venue: **North Wales Hand Rehabilitation**
Key people: **Lydia Hohman and Kimberley Smith**
Event: **Hand therapy clinic observation**

I had the privilege of visiting this small therapist-owned clinic. The clinic was established by 2 Occupational Therapists 6 years ago; Lydia and Kim. They operate with 2 office staff, 1 OT Assistant, and 1 contract OT. Both Lydia and Kim worked at the Philadelphia Hand Centre for many years. They are 45 mins by train from Philadelphia and in an area with a lot of industry, but very few services. Patients are happy to be treated close to home.

The equipment at the clinic was very similar to a standard clinic in WA. They used the Dexter computer program for evaluations, which was amazingly quick to use and print out reports.

The therapy provided was very similar to that which I provide. Patients were seen for 45 minute appointments. Some new ideas were keeping an exercise sheet at front of the patient's file, that was used as a record of exercises they had done and very useful for patients to follow their own schedule. They had some fun, easy to remember 'waving' exercises for improving wrist range of motion following a fracture, including wrist flexion and extension, wrist radial and ulnar deviation, and supination and pronation. They had a good Job analysis form, using information from the patients to determine the patients needs in terms of returning to work. They tend to do more strengthening than what we provide in WA. One reason for this is that many employers, due to legal reasons, do not accept employees back at work until they are fit for full duties, therefore strengthening and work conditioning are important elements of therapy.

An interesting new patient that was seen today had very acute symptoms of Thoracic Outlet Syndrome. She was in acute pain in the ulnar nerve region of her right arm. Lydia positioned a towel roll behind her back, and recommended positioning her arms on pillows to reduce the drag at shoulders. The patient reported immediate relief. An elbow splint was also fabricated for night use, and Lydia ordered elbow pads to avoid knocks during the day.

Another patient was a 14 year old girl with a congenital disorder resulting in a short ulna & radius. A different surgeon had previously put an external fixator on the patient and lengthened the bones 1mm at a time for 3 months to increase the

length of both forearm bones by 3cm. The patient then presented with fixed wrist flexion, as the soft tissue had not lengthened. Therefore, Dr Osterman re-operated and took the 3cm back out of the bones to improve situation. So the initial surgery was useless! The poor girl was just 14 years old and wanted to go rollerskating with her friends!

I had an excellent day at the North Wales Hand Rehabilitation clinic. It was great to see how a small independent clinic operates.

Date: **Thursday 14 March 2002**
Venue: **Moss Rehabilitation**
Key people: **Cindy Kwasniewski, Marge Tull, Jackie Templin**
Event: **Hand therapy clinic observation**

I spent the day at Moss Rehab observing different therapists. Every clinic is interesting to visit to see how they operate and how they are set up. At Moss Rehab, patients usually stay for 1 hour, with approximately half of the session with a therapist. The remainder of their session is spent independently carrying out their hand therapy program.

Many of the splints used at the clinic were off-the-shelf splints. Apparently the insurers have contracts with splinting companies, therefore the therapists are able to provide certain splints to patients more easily than others. One such splint was the JACE pronation/supination splint, that was incredibly heavy and bulky. The patient was required to carry this splint home in a large duffle bag that was provided. I prefer less bulky, lighter custom-made splints.

There was a very sad patient at the clinic today. A young African-American girl who has a partner, a 2 year old & a 4 year old child. Following surgery for her sinuses she was in a coma for 3 months, resulting in foot drop and severe hand contractures. 6 days ago she had MCP and PIP capsulectomies and joint releases, with all joints pinned. Therapy today consisted only of wound care and dressings (adaptic, gauze, bandage), due to significant pain. The patient has some residual problems from a head injury, becoming frustrated quickly and having trouble following instructions, making therapy difficult. She was discussing how difficult it has been looking after her children. Her mother helps out and her partner, however he works long hours in the music industry.

Today I was able to meet Cindy's friend, Jackie Templin, who runs a business called Hand Stand. She sells hand objects, including earrings, mugs, bookmarks, and just about anything. It is a new business and she sells mainly at conferences and on the website. www.justhands.com

Date: **Friday 15 March 2002**
Venue: **Moss Rehabilitation, Philadelphia**
Key people: **Cindy Kwasneiski, Marge Tull**
Event: **Hand therapy clinic observation**

I spent the morning observing the therapists at Moss Rehab again. I also briefly taught them how to make a tenodesis radial nerve palsy splint. They showed me a radial nerve splint that they fabricate with pajama elastic that looks relatively simple to make and effective, however it allowed no wrist movement.

I received a copy of the "Hand Surgery Quarterly" published by the American Association for hand surgery (not to be confused with the American Hand Surgery Association). I had not heard of this association previously. The association is primarily concerned with the education of hand surgeons and hand therapists. Apparently they often run combined conferences for the 2 professions, unlike many other conferences where surgeons and therapists are separate. The Association offers a Vargus Groat Scholarship yearly, enabling a hand surgeon and therapist to go as a team to a needy country to carry out treatment and teach skills to the local people. This sounds like an interesting and rewarding opportunity. Also, the next meeting of the Association in January 2003 is in Hawaii!!!

Date: **Monday 18 March 2002**
Venue: **Froedtert Memorial Lutheran Hospital**, **Milwaukee**
Key people: **Paula Galaviz, Gina, Cecilia Divine, Brad Grunert, Debbie**
Event: **Hand therapy clinic observation**

Paula Galaviz, a delightful Occupational Therapist, organised my 2 day visit at the Froedtert Hospital, a very large hospital in Milwaukee. Approximately 15 hand therapists work in the Hand Therapy department. I spent time with several therapists and surgeons, and a clinical psychologist during my visit.

I obtained some excellent resources from this clinic, including protocols for many conditions, an upper extremity exercise program, and an upper limb assessment package. A significant amount of work has gone into developing these excellent resources.

The specific sessions I had today were:
Wound care with Carol. We reviewed the latest types of wound care products, many of which are the same as we use in Australia.
Cumulative Trauma Disorders with Gina. The trend for treating lateral epicondylitis (tennis elbow) in the USA is towards proximal treatment initially. Techniques to improve posture, such as supine exercises with a foam roll are frequently used. I think this is a good idea and is worth investigating further.
Trauma Rehabilitation with Cecilia Divine. We discussed many protocols used for various types of hand trauma, including tendon repairs and fractures.

Psychological issues with Brad Gunert. Brad discussed post-traumatic stress disorder, factitious disorders, conversion disorders, and the role of Rehab Psychology in the return to work process. Brad's office is adjacent to the hand clinic, and he often walks through the hand therapy clinic and casually chats to patients. He feels that it is important to be familiar to the patients and part of the every day running of the hand rehabilitation service. Brad said that many patients have flash backs and nightmares. I watched some video footage of a patient having a flashback in a session with Brad. He was vividly re-living the accident, including yelling and crying, of when his hand was caught in a machine. Brad reports that allowing patients to relive these accidents often allows them to cease having flashbacks. He believes it is therapeutic, not cruel, to facilitate this process. As Brad was the first psychologist to work solely in a hand rehabilitation service in the USA and he is author of a related chapter in the Rehab of the Hand, he is well known. Referrals are therefore received from a wide area. A significant number of patients are referred who have factitious disorders. Brad has a method of confrontation used with these patients, which is apparently quite successful with most patients, who are then able to deal with the real issues in their lives.
Abdominal and postural exercises with Debbie. I do not often use these techniques with my patients, however they are useful for many conditions. It was good to receive some more information on posture and abdominal exercises.

Date: **Tuesday 19 March 2002**
Venue: **Froedtert Memorial Lutheran Hospital**, **Milwaukee**
Key people: **Judy, Gina, Carol, Barb, Diane, Dr Daley, Dr Dzweirzynski**
Event: **Hand therapy clinic observation**

I spent my second day at Froedtert observing hand therapists and surgery.

The specific sessions I had today were:
Work conditioning and RSD with Judy. The work conditioning area was very large and well set-up. Patients spend many hours here. Interestingly, the patient's primary treating therapist attends to the patient's wounds, splints, and specific exercises. Then the patient will frequently go to the work conditioning area and carry out a program of strengthening including putty, pegs, and many other hand therapy tasks, before going home for the day.
Ergonomics with Mary. Mary's role in the hospital is to assess and make recommendations in terms of ergonomics for both patients and staff at the hospital. We reviewed computer and work-station set-ups.
Trauma Rehabilitation with Barb. Discussion about splints and therapy provided post hand trauma.
Lymphoedema treatment with Diane. The treatment for patients with lymphoedema was similar to the care that we provide in Australia.
Observation at Dr Daley and Dr Dzweirzynski's clinics. One of the clinics was held in the hand therapy area. The therapists began with the patients, reduced their dressings, found out how they were progressing and began any required

therapy. The doctor moved around to see the patients as they were being seen by the therapist. The clinic ran very smoothly. I have never seen a doctor attend a therapy clinic! (It is always the reverse). The patients in this clinic were all having reviews. The other clinic was run in the doctors outpatient area, where patients were in small rooms waiting for the doctor and therapist team to assess them. The majority of the patients in this clinic were new patients.

I observed some surgery briefly, involving wash-out of a large forearm wound. I also spent some time talking to Paula Galaviz about her work in the area of Brachial Plexus injuries after birth. This is a very specialist area and the surgeons she is working with operate very early on patients with good results.

All in all, I had a fantastic 2 days in a dynamic hand clinic. I only wish I had longer to stay!!! I gathered some excellent resources.

Sweden

Date: **Monday 25 March 2002**
Venue: **Uppsala**
Key people: **Margareta Persson**
Event: **Hand therapy clinic observation**

I observed Margareta in a paediatric hospital today. She is a brilliant therapist. Margareta is the president of the Swedish Federation of Hand Therapists, and a committee member for the International Federation of Hand Therapists.

Spending a day with Margareta was inspiring. I love her saying that 'splints should be like clothes: able to be washed and worn'. I agree with her that splints should be durable enough to withstand washing in the washing machine. I will endeavour to live up to this challenge when fabricating splints in the future!

Margareta found the material Fabrifoam at a fabric wholesaler in Sweden, which is now being distributed by North Coast and is used widely in splint-making. She uses this fabric to make soft splints, including thumb and wrist splints. Margareta prefers this compared to neoprene, as it does not sweat, and is thin and light-weight. It was excellent to see the way she used this unique product. Margareta has designed many splints and products that we see in our hand therapy catalogues!

Date: **Tuesday 26 March 2002**
Venue: **Clinic Rajan, Uppsala**
Key people: **Anita Roos, Dr Rajan**
Event: **Hand therapy clinic observation**, **private practice**

Today I spent the day at Dr Rajan's private clinic. He trained with Professor Lundborg. For most of the day I observed an occupational therapist, Anita Roos,

who is employed by Dr Rajan. Again, the clinic set-up was very familiar. One unique aspect of their practice was that Anita sees all patients for an assessment and consultation prior to surgery. She advises them about what the surgery and follow-up entails. This pre-op consultation is very useful for obtaining baseline data and information on patients. Another excellent idea was the use of integrated notes on the computer. All of the patient's information was recorded in a file, and a log was kept by all treating persons detailing their intervention. The computers were networked, ensuring efficient and up-to-date notes. A patient may see the therapist for an assessment, that can be directly recorded onto the computer, followed by a consultation with the surgeon, who can read the therapy assessment and notes.

Date: **Wednesday 27 and 28 March 2002**
Venue: **Soderhukuset, Stockholm**
Key people: **Annike, Ami, Birgitta, Jenny**
Event: **Hand therapy clinic observation**

I spent two days at this large public hospital in Stockholm, where the hand clinic for the city is situated. It was wonderful! Annike, a physiotherapist, who is the head of the department, was a warm, lovely lady. There were 9 therapists who work with 15 hand surgeons. They were all very nice. They occupy a huge area in the hospital. Each therapist has their own treatment room, or sometimes two therapists share a room with a curtain dividing it. In the hand clinic, interestingly, the doctors rooms alternate with the therapists rooms. It was a very integrated clinic. The therapists in the hand clinic have their own outpatients booked in, and they rotate covering the doctors clinics, with one physiotherapist and one OT at each clinic. There is always a clinic operating.

There was a 15 bed hand surgery ward. If there were extra beds, they were occupied by Orthopaedics, which was classed as a very separate specialty. Apparently Orthopaedics treat a lot of the extensor tendon repairs, which is a source of frustration to the hand department. They have their own therapists that are very separate to the hand clinic.

An interesting delineation among the therapists was that the physiotherapists do not do any splinting. Most patients have an appointment with the doctor, and then the OT, followed by the physiotherapist.

I spent time with many therapists watching them treat patients. The standard protocol for extensor tendon repairs was immobilisation for 3 to 4 weeks. Occasionally dynamic splints with blocks on the traction component to limit full motion were used. For flexor tendon repairs they use the Klienart regime. They have used this for 6 years, and prior to this they used immobilisation. There is a meeting with all therapists and doctors in 2 weeks to discuss the possibility of using new protocols.

I saw several patients who had undergone a trapeziectomy with suspension arthroplasty. The therapists focussed on encouraging APL action to decrease the load on the thumb. They also used a soft ball to massage the thumb adductors to release tightness. Following this surgery, the patient's hand is immobilised in plaster for 5 weeks, and then they are provided with a hand-based splint. I saw 2 patients who had MCP joint replacements (Swanson). I also saw 2 children after brachial plexus surgery. One very cute 2 year old girl had a supraspinatus release and the OT was working on shoulder flexion and extension with games, including playdough and other bilateral tasks.

I learnt about a multi-centre study that is being conducted in Sweden by Lundborg for patients following nerve repair. I discuss this later in my report. There was a famous ice hockey player in Stockholm that was included in the study.

In terms of splinting, they used a lot of orfit and hexalite. They used Phoenix outriggers, that I found bulky, however the gliding motion of the outrigger was very smooth, with little resistance. One patient pointed out that due to the bulk he can't put his coat on with the splint on! I found out about a new strapping technique with velcro, however I did not learn any new splints.

I saw mirror training, which is a new technique to me. It may be useful for condition such as RSD, and sensory re-education. Apparently to "Trick the brain!" (cortical level).

Date: **Tuesday 2 April 2002**
Venue: **University of Malmo, Malmo**
Key people: **Birgitta Rosen, Ingela Carlson, Ranghild Cederlund, Professor Goran Lundborg, Freyja, Stefan, Dr Lars Necking**
Event: **Hand therapy clinic observation, Surgeons pre-op clinic**

The hand clinic in Malmo is the largest hand trauma clinic in Sweden. The hand clinic is huge, covering 5 floors of a large building, with areas for outpatient doctors clinics, administration, therapy, a ward, and operating theatres. This clinic visit was the highlight of my trip, due to the lovely people and the interesting research that they are conducting. They are experts in the rehabilitation of hands.

I spent some time with Ranghild, who has been researching cold intolerance in patients post-trauma and post-vibration injury. Her main area of research is vibration injury, and she will complete her pHd this year, describing this condition. It is a very unrecognised condition, resulting in chronic, irreversible damage. Ranghild said that often the hand resting on the machine is the most damaged, with less severe damage to the hand that operates the handle or lever. Research is difficult to conduct because both hands are damaged and therefore you don't have a normal hand to measure. In the clinic at Malmo they have built

a cold room (zero degrees) for conditioning patients with cold intolerance (based on an idea from Canada), like the concept used for Pavlov's dogs. Initially a cold provocation test is performed. The temperature of all fingers is measured. Patients then stand in the cold room (0 degrees) with their hands immersed in water at 15 degrees for 10 minutes. Following this, in a room of normal temperature, finger temperature (over the nailbed) of all digits is measured every 5 minutes for 30 minutes, to determine how quickly the temperature of the digits returns to normal. Treatment consists of 18 sessions (3 times a week for 6 weeks) of approximately 2 hours each. The treatment consists of 10 minutes in the cool room (0) with hands immersed in warm water (43 degrees), then 10 minutes in the normal room (Repeated 3 times). Findings have shown that after a series of treatment, patients post-trauma report an improvement subjectively, however their digit temperatures have not increased at 30 minutes. Interestingly, the patients with vibration injury show an improvement in digit temperatures of 2 degrees, but subjectively report no improvement! Even in Australia I have found that many patients develop cold intolerance problems and are unable to return to occupations such as being a butcher after a hand injury, due to an inability to tolerate the refridgeration.

I attended a pre-op clinic with the surgeons. They met all of the patients in the afternoon prior to surgery tomorrow. Those living a long distance from Malmo were admitted for the night, while those living closer will return to the hospital tomorrow. All of the patients were sitting in the patient lounge and the team moved from one patient to another conducting a very informal but effective clinic. The team consisted of 2 surgeons (Dr Lars Necking and another), one junior doctor, several anaesthetists, a nurse, and the OT. The patients seen at the clinic included:

1) A girl who was requiring a salvage procedure after an unsuccessful lateral epicondylitis release. An anconeous transfer would be used to replace the bulk of the debrided tissue from ECRL & B (and in fact most of the extensors). Dr Necking learned this procedure in Seattle, and reported that 70% of patients were improved post surgery. He then decided to try it as a primary procedure for lateral epicondylitis, however he found only a 70% success rate again, therefore does not recommend this. He feels that the reason it is successful is that you replace scar tissue with good muscle tissue. I have not seen this surgery performed in WA.
2) A young girl with bilateral volar central wrist ganglions. These ganglions were in an unusual place, as wrist ganglions are usually dorsal or if volar they are usually placed more radially. The ganglions were to be removed as they are symptomatic when she writes and conducts her normal daily activities.

Later in the day I observed a very nice therapist, Freyja, who made excellent splints. I watched her fabricate a dynamic splint for a patient post Dupytren's release, and static and dynamic splints for a patient post extensor tendon centralisation of the little finger. She used an interesting plastic device on the outriggers that provides minimal resistance, that is fabricated at the hospital and

inserted onto the wire of the dynamic outrigger. Freyja treated an interesting patient who had had a groin flap to his thumb six months ago. He was awaiting revision of the surgery to reduce the bulk of his thumb, and unfortunately still had a non-united fracture in the distal phalanx of his thumb, therefore was requiring ongoing splinting. This man also had a stiff shoulder as a result of the surgery.

I had not seen dynamic splinting used post Dupytren's release until the USA (where it appeared to be a new practice), therefore it was interesting to discover that most Swedish therapists have used it for a long time.

Date: **Wednesday 3 April 2002**
Venue: **University of Malmo, Malmo**
Key people: **Goran Lundborg, Dr Nelling, Birgitta Rosen, Ingela Carlson**
Event: **Surgery, Hand therapy clinic observation**

I observed Dr Nelling operating. The first patient was administered a local block only and an incision was made over the dorsum of thumb metacarpal. The patient was asked to actively flex and extend her thumb, and EPL was observed to be subluxing in a volar and ulnar direction. EPL was therefore acting as an IP extensor and an adductor, and no longer as a thumb extensor. The surgeon released the extensor hood ulnarly and folded hood back on top of the tendon suturing the hood in a postion to hold the EPL tendon in a more central alignment. Dr Nelling placed a plaster on the patient that he said would remain on for 5 weeks. This was very interesting surgery to observe, because I was able to see the EPL tendon moving actively. I observed other interesting operations performed by Dr Nelling.

Following this I was able to observe the famous Professor Goran Lundborg operate. He performed a Dupytren's release on an elderly lady of the middle, ring and little fingers. He excised numerous small bands of disease. This was somewhat difficult as the digital nerves were winding their way around the bands, and therefore had to be dissected carefully. He was able to do a primary closure, making Z-plasties within Z-plasties. He said the worst thing you can do before surgery is to mark all of your Z-plasties, because it all changes when you get the fingers straight. The nerves to the ring finger were very taut and near to the surface of the skin at the time of closure. He said you have to be very careful not to excise too much and create unnecessary scarring. Professor Lundborg informed me that he uses his fingertips to distinguish between normal tissue and Dupytren's tissue throughout the surgery. Dynamic splinting was to be used post-operatively to avoid too much pressure on the nerves.

Professor Lundborg was a very nice man, and I talked to him throughout the operation. He said that a neuroma-in-continuity was a very difficult problem. Sometimes symptomatic neuromas do mature and become asymptomatic. He said there are no rules about when to operate, and often waiting is good. I also asked him what type of nerve repair he performs now. He does not repair each

fascicule (except occasionally in the ulnar nerve), as this had not been shown to improve results, and the invasive surgery may cause more scar tissue. He does not use any nerve growth factors, as it has been shown that an injured nerve sends out an alarm, producing many growth factors itself. It is not known whether additional factors injected when repairing nerves are useful. He was the person who developed the idea of using silicon tubes in nerve repairs, to collect growth factors and keep them in the vicinity. Professor Lundborg reported that this technique does work, however is perhaps not necessary. His belief is that whether surgeons like it or not, they have not had any advances in repairing nerves for decades. Professor Lundborg feels that we must focus on the Cental Nervous System to achieve better outcomes after nerve repair.

Professor Lundborg and many other groups have performed many studies on the use of silicon chips. He has shown on rats that the nerve grows through the chip, hypothesising that this could potentially be used to innervate prosthetic arms like muscles. Amazing!!!

I spent time with Birgitta Rosen learning about her research on sensation. She gave me a signed copy of her book, “The Sensational Hand”, which is a collection of her published articles. She discussed her research with me in consecutive order, and it was fascinating. So much work has gone into it. It is excellent. Birgitta has been involved in nerve research since 1991 and have completed her pHd. In conjunction with Professor Lundborg she is currently conducting a multi-centre study in Sweden on artificial sensibility.

Artificial sensibility was initially invented to be used with prostheses, to provide feedback about the environment. The glove was produced and ready for purchase 2 years ago. The glove is now being used in the trial for patients with complete ulnar, median or both nerve lacerations, from the first week post injury to when the patient develops discriminative sensation in the hand (purple). The glove is not used longer, so as not to confuse the brain. The silipos finger tubes with microphones attached are used if dressings or plaster prevents a glove from being fitted. The microphones are used on the affected digits (thumb, index, middle for median) and the patient wears head-phones. The patient then carries out sensory re-education with different textures twice a day for 10 minutes. When rubbing different textures on the microphones you can hear different noises. Research has shown that following a nerve injury the central nervous system reacts as if the insensate area has been amputated. The theory of artificial sensation is that it will prevent the mind from thinking the finger has been amputated, perhaps keeping pathways open or creating new pathways. Very interesting! Birgitta reports that the earphones are cumbersome and if patients are to use this more in their daily lives in the future a small chip may be able to be fitted behind the ear (way in the future!). Birgitta is so passionate about the area of artificial sensibility. She highlights the fact that people who are blind have substituted vision with touch for many years to explore the world, providing a parallel for the use of auditory feedback to replace touch.

When discussing sensory retraining, Birgitta reports that a more global perspective of sensation will be studied in future research. She states that our senses often act together. For example, with an orange, you feel the soft, smooth texture, you smell the scent with your nose, and you look at the colour with your eyes. Sensory re-training should perhaps use more of our senses together, including bilateral hand use rather than one-handed, as this is often how we use our hands.

Birgitta stressed that sensory retraining is very important, and recommended several sessions per day. Some studies have shown a training effect that disappears after training, however the sensation is still improved. Retraining involves first touching your own hand while looking and speaking to yourself about what you see (for example, "I am touching near the base of my thumb) to provide as much feedback as possible. Then with vision occluded, you touch your own hand with objects such as a pen, and try to guess where you have touched. Following this, you can have someone else test you. Use of different textures for sensory retraining is important several times a day. Birgitta encourages patients to incorporate sensory reeducation into their everyday lives.

Birgitta's comprehensive research has resulted in the development of a sensory assessment. I had the privilege of observing Birgitta perform a sensory assessment on an 11 year old boy. He had median and ulnar nerve lacerations 3 months ago, and was progressing very well. The assessment uses many commonly used tests including the Semmes Weinstein monofilaments, and 2 point discrimination. In addition to this, Birgitta has developed the Form STI test, due to the need for a test to assess tactile gnosis, as the 2 point discrimination tool is quite poor. It is now being produced and is available in the North Coast catalogue. Please see the photos attached at the end of this report. Birgitta's protocols are on this site. www.hand.mas.lu.se/

I spent time with Ingela. She showed me a website for an electronic textbook of hand surgery, which is a good resource. www.eatonhand.com/ A surgeon from Florida has compiled information about surgery, post-operative protocols, and patient hand-outs. Very interesting. Ingela was currently updating the protocols they use after extensor tendon repairs, and she has obtained all recent references. Ingela stresses the need for evidence-based practice, and therefore they are using the published protocols with the best results. This includes the Norwich regime for zone 4, Khandwala's regime for zones 5 and proximal, and a protocol for zone 3 based on Thomes & Thomes. Her main area of interest has been researching cold intolerance. Ingela developed the cold room. She is currently introducing McCabes and Irwins Cold Sensitivity Scales (produced by hand surgeons) to assess cold intolerance in as many patients as possible.

I discussed the current practice for the treatment of flexor tendon repairs with Stefan, the head of physiotherapy. They have recently started using an early

motion protocol after using Kleinart for many years. Patients are fitted with a plaster positioning the wrist in 25 degrees of extension, the MCP's in 65-70 degrees of flexion, and extending1cm longer than longest digit. The plaster is flat, and wide enough to comfortably abduct & adduct fingers the fingers to reduce swelling. A good idea and something I have not previously done. Mobilisation is commence on the 3rd post-operative day. The plaster is removed after 4 weeks. Stefan reports an 11 % rupture rate, with most ruptures occurring between 5 & 8 weeks (apparently comparable to other studies).

All in all my two days at Malmo were the most inspiring two days I can remember!!!

Date: **Thursday 4 April 2002**
Venue: **Lund University Hospital, Lund**
Key people: **Margareta**
Event: **Hand therapy clinic observation**

Today was a fairly quiet day spent at the Lund University Hospital. I spent time with the OT, Margareta and an OT assistant. Hand therapy is not a specialty at this hospital and there is one OT and one physio that work in hands. The patients were relatively straight-forward. It was good to see some different varieties of off-the-shelf splints.

They have an OT assistant who sews leather splints that are excellent. They take 5 hours to sew, and are provided for long-term use. For example, when surgery fails.

Date: **Friday 5 April 2002**
Venue: **University of Lund, Lund**
Key people: **Kirsten**
Event: **Hand therapy clinic observation**

I spent the day with Kirsten, the hand physiotherapist today. She used needle acupuncture on 3 patients, which I have never seen before. Apparently this is commonly used by physiotherapists in Sweden. Another patient was seen for the treatment of lateral epicondylitis. She advised the patient to carry out the following stretches five times once per day; shoulder internal rotation, pronation, and wrist flexion. Followed by eccentric exercises only. Using a 1kg weight the patient was asked to lower their wrist from extension to neutral eccentrically for a count of 10. They passively extended the wrist again and repeated this. A patient had been referred by the doctor with a referral saying he had a psychosomatic illness!!! He was a postman, and had only been doing this work for 3 months. Assessment of this man found that he actually had DeQuervain's tenosynovitis!

Date: **Sunday 7 April 2002**
Venue: **Train to Lund to Copenhagen return**
Key people: **Birgitta Rosen, Christina JeroschHerord**
Event: **Discussion throughout the day**

Although today was not an organised study day, I went on a journey by train to Denmark to an Art Gallery. I was taken by Birgitta Rosen with Christina Jerosch-Herord, who is the editor of the British Journal of Hand Therapy. It was a fun and interesting day. I enjoyed the discussion about our careers and the hand therapy world. It was great to make contact with Christina in terms of publishing the British journal in the future!

Date: **Monday 8 April 2002**
Venue: **University Hospital, Linkoping**
Key people: **Gunilla Enstrom**
Event: **Hand therapy clinic observation**

I spent the day at Linkoping University Hospital. I observed therapists treating patients and was also able to observe and participate in an education session for country therapists. This centre has done a lot of research into the Kleinart regime for flexor tendon repairs and has previously published work in this area. I observed use of the Kleinart regime on a few patients today. They keep the patients in plaster of paris, rather than providing thermoplastic splints, to encourage compliance. Gunilla said that they would continue using the Klienart regime until there were published studies stating better results.

London
On my way home to Australia I visited London. Here I found a most interesting exhibition called 'Body World'. A man by the name of Professor Gunther Von Hagens', who owns a company called Korperwelten, is using a method of plastination to preserve body parts. The exhibition included full bodies, and many different parts of bodies, such as blood vessels only. It was fascinating. As a hand therapist I usually see the outside of the body only and rarely have the opportunity of seeing the tissues I am actually working on! It was a very good learning experience.

Conclusions and recommendations

My time in the USA highlighted the following current issues in hand therapy:

1. Managed care has been implemented with a huge impact on hand therapy clinics. This system is leading many private practices to close or amalgamate with large health care centres. One of the results of managed care is that doctors are required to choose one centre that they will refer all of their patients to for allied health services. Therefore they are needing to choose a large centre that provides many different services.
2. There is a group of persons who are not eligible for services. Private health insurance is too expensive for individuals to buy, therefore it is included in most employees work packages. Also, many States have minimal funds available for providing services for the unemployed. Some lower paid jobs do not however include insurance, and these persons are not eligible for the funds provided for the unemployed, therefore they cannot afford treatment. Some hospitals and clinics have afternoons where they provide treatment free of charge, however the amount of care these people receive (if any) is not usually adequate.
3. The hand therapists disappointingly make fewer custom-made splints. The reason for this is two-fold; therapist time is too costly, and insurers often have contracts with splinting companies and therefore will only approve these splints.
4. Employees are increasingly being allowed to return to work only when they are fit for full duties, due to legal issues. Previously workers may return to work on light duties initially. This trend is resulting in hand therapists doing more strengthening and work conditioning programs with their patients, increasing the length and duration of time spent in therapy.

Some observations about hand therapy in Sweden are as follows:

1. The hand clinics are linked with universities, and therapists are involved in a significant amount of research. In Western Australia I am not aware of any therapists that are funded for research in hand therapy. The research is resulting in many advances in hand therapy.
2. Swedish therapists are very precise and often adhere to evidence-based practice, following protocols that have been published with the best outcomes.
3. Swedish patients are extremely compliant compared to Australian patients.

On my return to Australia I have started to disperse my knowledge with my colleagues in the hand therapy community, endeavouring to improve treatment quality and increase the body of knowledge in hand therapy. I will continue to share my increased knowledge and skills with hand therapists in WA and Australia, through the hand interest group meetings, the Australian Hand Therapy Association meetings and journal, the Occupational Therapy

Association, conferences, workshops, my work places, and with students through supervision.

I will conduct further research in the area of hand therapy. Research is very important in terms of evidence-based practice and funding issues, in addition to improving patient care. The focus on research in hand therapy in Sweden was invaluable and inspirational to observe. I would like to remain active in research and education in hand therapy in Western Australia.

I have also been able to implement new techniques in my clinical practice and utilise new resources. Some of the benefits of my fellowship were discovering new resources, new products, different techniques, and alternative protocols for the treatment of hand conditions.

Another benefit of this study trip was the development of new contacts with overseas therapists. Already one of the key people I met in Sweden, Birgitta Rosen, has agreed to come to Australia to present at our National hand therapy conference in 2004. This is very exciting. Maintenance of relationships with international hand therapists is important for the growth and development of hand therapy in Australia.

This Churchill Fellowship showed me that in Australia our standard of hand therapy is very high. I would like to recommend that all hand therapists continue to provide an excellent service and to participate in research, implementing evidence-based practice in clinical settings. I feel very privileged to have had the experience of a lifetime on my 2002 Churchill Fellowship! My aim is to provide information and resources to any persons who would benefit from this knowledge.

<u>Specific recommendations:</u>

1. Presentation to hand therapists at Fremantle Hospital (completed).
2. Provision of resources to hand therapists at Fremantle Hospital (completed).
3. Present findings of Churchill Fellowship to members of the Australian Hand Therapy Association (WA branch) on October 12th (organised).
4. Teach new splinting skills to hand therapists in WA at a workshop in March 2003 (organised).
5. Implement new techniques and assessments in clinical practice. For example, the new sensory assessment including the Form STI Test.
6. Publish summary of findings in the AHTA newsletter for Australian hand therapists.

Malmo University Hospital, Sweden – Birgitta Rosen – Nerve Research

Form STI Test

Tactile glove used for Artificial Sensibility

Birgitta Rosen using the glove