From The Editors Desk
Hot summer days...we have some great new releases to cool you off, check them out on page 8.

If you are studying for Certification in Hand Therapy, don’t miss the Hand Therapy Certification Package Discount PROMO. This package is designed to help you study for the big day. Check out details on page 8.

EHT’s hand club is designed for networking, sharing, and learning while having fun. All of your posts are answered. You can even post photos for those perplexing cases and the club will help you out. So don’t hesitate join today. See page 6 for details.

We had great response to our LEARN & ENJOY program. You can receive FREE CEU’s for reading this magazine. See details on page 14. See you online.

EHT’s magazine is for informational purposes only and is not intended to be a substitute for professional medical advice, diagnosis or treatment. Always consult with your supervisor before implementing ideas.

Thank you to our sponsors for making this magazine possible. Please click on their ideas.

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In The Spotlight
Susan Weiss
OTR, CHT
Nancy Falkenstein
OTR, CHT, CEES

Featured Article

Tendon Transfer Rehabilitation: Strategies for Success

By Debby Schwartz, OTR/L, CHT

Working with tendon transfer patients can be a challenging yet an extremely rewarding experience. These are patients who through trauma, a disease process, paralysis, or maybe a congenital abnormality have lost some vital component of upper extremity functioning. When speaking of the need for tendon transfers, we are really speaking of imbalance in the hand. The muscles that are no longer functioning have left their antagonist muscles unchecked. And this can lead to additional problems of contractures and deformity. The process of tendon transfers offers a rebalancing of the hand by introducing donor muscles to take over the actions of the non-working muscles. They help to enhance function. Positive outcomes require careful planning, preparation, and therapist creativity to facilitate these donor muscles into action.

The following ten important fundamentals will help to clarify the tendon transfer process, and guide you in establishing strategies for success with your patients.

1. Pre-operative Therapy
The role of the hand therapist doesn’t necessarily begin after surgery. As part of a team approach, the hand therapist contributes significantly to the preoperative care and treatment of tendon transfer patients as well. Perhaps you already know the patient and have reached a plateau in functional recovery after trauma, leaving your patient with significant deficits. In anticipation of further surgery, scar adhesions, edema and soft tissue must be addressed and minimized. Joint contractures or limits in passive range of motion can be treated with stretching and

continued on page 3
“Thank you for developing such a “hand saver” of a product... not only welcoming to the client/patient it is appreciated by the therapist.”

Dear Perry,

Wow!!! Prossage makes my life better. I have been using this product for a few months. Deep tissue mobilization, trigger point therapy and especially scar remodeling has never been easier on my hands as the PROSSAGE Heat glides over the targeted area.

I love it on lateral epicondylits when the supinator is involved. The gentle heat produced is warming and calming for the patient as I work the muscles followed by a nice stretch. Muscles involved in radial tunnel are tender and Prossage Heat allows me total control of targeted muscles without slippage. I have also found Distal Biceps repairs to benefit greatly from PROSSAGE Heat due to the deep nature of the repair and the location of the incisions; hence scar remodeling with PROSSAGE Heat about the elbow is effective and efficient.

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Thank you for developing such a “hand saver” of a product... it is not only welcoming to the client/patient it is appreciated by the therapist. In fact, our clinic had to order multiple bottles of the largest available size so we all can utilize this great product. Again, thank for making my job easier.

Nancy Falkenstein, OTR/L, CHT, CEES

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EXPLORING HAND THERAPY

splinting. You can help your patient anticipate the benefits of the tendon transfer surgery by the use of splints that replicate the action of the transfer. For example, a wide thumb abduction cone helps the patient realize the significance of thumb abduction for better grasp of objects. Better still, maybe you have been working on strengthening muscles in advance of their use as donor muscles. All of these preoperative interventions enhance the success of tendon transfer surgery!

2. Patient Education

The patient must have a solid understand of the entire process and timing of surgery and rehabilitation. The therapist is best qualified for this role as patient educator especially if a patient-therapist relationship has already been established. The patient (and patient’s family if working with a child) must understand what can be accomplished with tendon transfer surgery and what cannot be accomplished. The concept of a normal hand is simply not an option. However, significant and important functional improvements can become a reality if the patient is up for the task and recognizes his role. He must understand why a period of immobilization follows surgery, and what to expect when active range of motion is initiated. He should also have a sense of how much therapy is anticipated, and when he will be seen by the surgeon in follow up visits.

3. Patient History

The therapist in turn should have an equally solid understanding of what the patient has been through prior to arriving in the clinic. Was there a traumatic event, multiple surgical procedures and/or therapy visits before tendon transfer surgery was offered? Was this a deficit from birth that had never been addressed before? A paralysis of one peripheral nerve, or a disease process that progressively worsened? It is helpful to note where previous scars formed, how the soft tissue feels in the extremity, and the condition of the joints before and after surgery. The patient’s tolerance for pain, ability to cope, level of patience and understanding are also assessed. This helps the therapist develop an appropriate and individual plan of intervention.

In the SPOTLIGHT!

Laurie Roundtree, OTR/L, CHT

Q: Where did you receive your OT degree from?
A: I graduated from Tufts University in Boston in 1980

Q: What type of setting do you work in?
A: I co-own a private practice in Thousand-Oaks, California, with my best friend Heidi Bowers-Dutra (Yes, it’s possible to be a business partner with your best friend!). The practice was originally owned by our belated friend Ann England, one of the pioneers in hand therapy

Q: How long have you been doing hand therapy?
A: Fresh out of school in 1980 I began working for two Hand Surgeons. At that time there weren’t many hand therapists around. I learned a lot about surgeries and anatomy, and the importance of attending surgeons’ conferences periodically.

Q: What is your favorite diagnosis and why?
A: MP arthroplasties are a lot of fun to me. There’s nothing like the magic of a patient seeing their hand normally aligned after years of deformity. I love the precision splinting involved, and enjoy fabricating custom neoprene supports for the later phase. (I haven’t seen a commercial anti-ulnar-deviation splint that I like yet.)

On the reverse side, I love mallet injuries, because they are so simple and predictable, and my results are nearly always excellent. The keys are patient education, skin care, and capable splinting.

Q: What do you find is the most challenging diagnosis you treat?
A: What I find most challenging equates with another of my favorite diagnoses: complex crush injuries with multiple-system trauma that keep you constantly on your toes and necessitate problem-solving on a daily basis. If there are open wounds, I particularly enjoy the utilization of light therapy (cold laser) and advanced wound dressings to accelerate the healing.

Q: What areas of hand and upper extremity rehab. do you want to expand your expertise in?
A: I haven’t yet determined a specific area, but rather, I want to continue my education through reading, conferences, and post-professional courses. I think it will lead to a growing number of diagnoses and conditions that I will focus on.

Continued on page 6
Have you been looking for ways to give your splints a more fun, less “clinical” look? Do you believe that you could achieve more compliance with a multicolored design? If so, this one’s for you. Sammons Preston Rolyan is proud to introduce...

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4. Protocol

Tendon transfer rehabilitation follows a specific timetable of phases:
• Phase 1: Immobilization,
• Phase 2: Mobilization, and
• Phase 3: Strengthening.

This holds true regardless of which muscles have been transferred. The therapist must always be aware of specific dates. The date of surgery is crucial because from it the timing of the rehabilitation process is derived. Immobilization usually lasts 3 ½ - 4 weeks from the date of surgery. Active range of motion is typically initiated at that time. As the patient progress with active motion and functional tasks, more resistive exercises can be introduced. This occurs at 8- 12 weeks after surgery. Splint wear to protect the transferred muscles continues for about 6 weeks, depending of course on the surgeon’s preferences. And it is always helpful to know when the surgeon will be seeing the patient again in follow up. So be aware of dates and anticipate the next step in the process.

5. Donor Muscles

The donor muscles are intact muscles that have not been affected by paralysis or trauma. The surgeon selects the donor muscles based on their excursion and direction of pull. Here, too, the therapist can offer assistance preoperatively by performing accurate manual muscle testing (figure 1). This ensures that the possible donor muscles are indeed intact. Harvesting a donor muscle for a new function should not lead to additional loss of function. Secondary muscles with similar functions to the donor muscles are left intact. For example, the Pronator Teres can become a wrist extensor following radial nerve palsy because the Pronator Quadratus still is intact for pronation of the forearm.

6. Splinting

At 3 ½ to 4 weeks after surgery the post operative dressings are removed. A thermoplastic splint is now fabricated protecting the sutured tendons in a position that eliminates tension on the repair site. Similar to protecting tendon

continued on page 12
These two sites have good articles featuring tendon transfers with some diagrams, schematics and photos:


This shows a nice review of how an opponensplasty is performed:
- http://www.eatonhand.com/img/IMG00095.htm

Wheeless has some good articles on tendon transfers and is a good site to browse:
- http://www.wheelessonline.com/ortho/tendon_transfers_for_low_median_nerve_lesions

**Q: What accomplishments would you like to share with the hand therapy community?**

A: I'm very proud of our practice, Hand Rehabilitation Specialists, and the 5 CHT's and PT that comprise our staff. The recent completion of our website was another achievement: www.hand-specialists.com. I was also excited about a recent non-traditional consultation job: spending a day on set as a "technical advisor" to Jim Carrey for an upcoming movie called The Number 23. More about that in the next newsletter…

**Q: What do you do for fun when you are not busy in your hand clinic?**

A: I get a massage. A nice, long, deep one.

**Q: Do you have an area of clinical expertise that you can share with us such as a tip or trick that we can try in our clinical practice?**

A: Basal joint arthritis of the thumb is often an under-treated diagnosis. It can be absolutely debilitating, yet many therapists stop at giving an uncomfortable splint and a few tips on joint protection. I urge everyone to refine your splint skills in this area: be creative, try new patterns, wear the splint for half a day. One splint tip is to use a piece of neoplush at the dorsal aspect of the first metacarpal in a splint such as Judy Colditz’s. It is easily held with 2 thin strips of hook Velcro, is durable, and can be removed for cleaning. Be ready to give a thumb spica if a short opponens is unsuccessful. Offer a soft splint such as the Comfort-Cool as an alternative support as pain decreases. I even make a separate night splint, hand-based and volar, to hold the thumb in slight radial abduction (reduces pain of shortened thenar muscles and worn areas of cartilage). Go over joint protection in detail and have lots of sample adaptive devices. Why do we take tennis elbow or deQuervain’s more seriously than CMC OA? We have the best skill set to address this increasing problem, and the aging community can benefit greatly from programs in our clinics.

Thanks Laurie, We can’t wait to hear more about Number 23.
What makes a great flavor? Something that appeals to a lot of different tastes. NCM Vanilla® thermoplastic accommodates a variety of splinting styles and can be handled lightly or aggressively. And, NCM Vanilla® is ideal for most splinting applications. It’s a great choice for clinics that want to stock a single, all-purpose thermoplastic. NCM Vanilla® has moderate characteristics that allow the splinter to control the material with ease throughout the molding process, offering ample time to form the splint, remove it and make final positioning adjustments. NCM Vanilla® is a versatile thermoplastic that suits all experience levels and is ideal for almost any type of splint. Call for a free sample, 800-821-9319.
A soft, flexible, protective dressing for treating hand wounds

Facilitates rehabilitation allowing greater range of motion and more productive therapy.

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Loose fitting and soft against sensitive wounds - reduces pain during application, improves comfort, and helps enable functional self-care activities.

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The PSI Burn Glove

Newly Released CEU Courses!

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<tr>
<td>This package includes, Basics and Beyond, 3 online practice exams, two bonus DVD movie courses (A Royal Pain in the Thumb and Lateral Epicondylitis- You Have Control) and membership in our popular hand club!</td>
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<th>Intrinsics: Unravel the Mystery</th>
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<td>This course is in movie format and is designed to teach the clinician to effectively identify, and treat intrinsic problems. It is a mixed level learning course. A thorough anatomy session is completed to ensure the understanding of the biomechanics and kinematics of these complex structures. Splinting, stretching, exercises, treatment activities, and modalities are presented in great detail.</td>
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<th>Fractures of the Upper Extremity: I've Fallen and I Can’t Get Up</th>
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<td>This is the most comprehensive fracture course you will ever take. Learn therapeutic and surgical intervention of fractures from the shoulder, elbow, forearm, wrist and hand. You don’t want to miss this comprehensive movie course.</td>
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<th>Neurodynamics of the Upper Extremity Evaluation and Treatment Strategies: It’s Not Just About The Hand</th>
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<td>Learn ways to evaluate proximal problems that may result in distal symptoms. These evaluation strategies will help determine if the symptoms are distal or if there is a complex of upper quadrant problems such as: neck, shoulder, postural or scapular dysfunction. This course will describe the neural continuum as well as special tests to determine what nerve structure is involved. Emphasis will be placed on understanding and performing upper extremity neurodynamic testing.</td>
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Evelyn J. Mackin
Fellowship in Hand Therapy
Hand Rehabilitation Foundation
North Coast Medical, Inc.
The Philadelphia Hand Center, P.C.
College of Health Professions at Thomas Jefferson University

Applications are now being accepted for a funded fellowship position in the Hand Therapy Department of The Philadelphia Hand Center, P.C., starting in January 2, 2007 and July 1, 2007. A six-month fellowship is offered in hand management and patient care, including pre- and postoperative assessment, treatment planning, splinting, return-to-work programs, and outcomes. Applicants must be a graduate of an accredited occupational therapy or physical therapy program (bachelor’s or master’s degree), be licensed, and have a minimum of one year’s clinical experience, preferably in the area of upper extremity rehabilitation. Applicants will be selected on the basis of their demonstrated interest in the specialty of hand rehabilitation and their desire to advance their therapeutic skills in hand management. Preference will be given to applicants who evidence financial need and will practice in an underserved area. The deadline for submission is September 1, 2006 for the January 2, 2007 fellowship, and March 1, 2007 for the July 1, 2007 fellowship.

For more information, visit our web site at
www.handrehabfoundation.org, or contact:
Terri Skirven, OTR/L, CHT, Director of Hand Therapy,
The Philadelphia Hand Center, P.C.
834 Chestnut Street, Suite G-114, Philadelphia, PA 19107
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Includes 3-Position MARV Handles. You get 3 different grip positions for a complete range of effective wrist and elbow exercises to improve your patients wrist and elbow range of motion.

Regain the following motions:

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<th>Movement</th>
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<th>Extension</th>
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<td>Radial Deviation</td>
<td>Ulnar Deviation</td>
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<td>Supination</td>
<td>Pronation</td>
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PLUS MANY MORE!

Unlimited resistance levels are available with tube or band. Each kit includes an easy to follow exercise program that your patient can use in the clinic or at home.

Suggested retail only $19.95 includes:

- 2 ea. 3-Position MARV Handles
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- 1 door attachment
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Political Corner

**Update on Quality Standards for Suppliers:**

As of May/June 2006 CMS has not completed their Quality Standards for Suppliers review. We were informed that over 5,000 physicians, therapists, patients, and others responded to this very important issue. CMS is still reviewing the comments and has not made a decision. EHT will keep you posted on this critical issue.

The splint issue in a nutshell: CMS is identifying what discipline is considered an expert for fabricating and dispensing orthotics/splints. An expert is defined (according to Quality Standard for Suppliers) as a person qualified in trimming, bending, modeling, assembling, or customizing (orthotics) and is governed by a national board. At present the draft mentioned the expert as being certified by the Am. Board of Certification in Orthotics and Prosthetics. AOTA/HTCC/APTA/ASHT are not mentioned as a governing board in the draft. Obviously, our concern is to get the language to include OTs and PTs.

Thank you for all who flooded CMS with concerns. Our voice was hopefully heard.

---

**Update on Competitive Bidding:**

On May 23, 2006 EHT joined the CMS Competitive Bidding open phone forum. CMS is planning on launching the program by January 2007. Competitive bidding will follow the Quality Standards for Suppliers recommendations when determining who is a qualified splint fabricator. The rest of the proposal is dealing with DME providers and all the new regulations. EHT will keep you posted on this as well.

To learn more about these issues, visit the Center for Medicare and Medicaid Services (CMS) at: www.cms.gov
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TheraFlex™ RSI represents an innovative advancement in topical therapeutics technology and is a valuable adjunct to your RSI treatment regimen. A Tufts University clinical trial of TheraFlex™ in temporalmandibular joint disorder ("TMJ"), a form of RSI, provided confirmation of the pain relieving ability of the TheraFlex™ approach. Patients who used TheraFlex™ experienced 68% less pain after two weeks. This pain relief was obtained with just two daily applications and TheraFlex™ was shown to be effective in reducing pain in both the masseter muscles and the TMJ joint. Findings of this breakthrough study were published in the Cranio: The Journal of Craniomandibular Practice (April 2004, Vol. 22, No.2).

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How To Use TheraFlex™ RSI
Incorporating TheraFlex™ RSI to your therapy regimen such as massage, exercise, stretching, ultrasound, etc., will enhance your client's response each session. Used between sessions, TheraFlex™ RSI will help to further consolidate these gains. TheraFlex™ RSI is most effective when used regularly and consistently by your clients. Excellent results can be achieved with as few as 2 (two) applications a day.

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In the News
View KNBC 4's Emmy Award winning medical reporter Dr. Bruce Hensel's report on TheraFlex TMJ at www.nbc4.tv/health/index.html
lacerations, the splint immobilizes the donor muscles with their new insertions. Initially the splint is worn full time except when performing exercises. Gradually the splint can be taken off to perform active range of motion exercises and then activities of daily living as well.

Here are some examples of the protected positions following tendon transfers for:
- Radial nerve palsy: wrist and MP blocking splint with the wrist positioned in 30° of wrist extension, the MP’s in 0 to 10° of flexion (fig 2). The thumb is supported in full extension if included in the surgery. The elbow may be splinted in 90° of flexion to protect the origin of the donor muscles.
- Opponensplasty to restore thumb opposition and extension or abduction: The wrist is positioned in slight flexion and the thumb in wide abduction. Wrist position depends upon donor muscle selection and routing of transfer.
- Ulnar nerve palsy transfer to decrease clawing and aid in MP flexion: Similar to dorsal blocking splint following flexor tendon repair, wrist in 30° flexion, MP’s flexed around 60° and IP’s extended.

7. Functional goal setting

The therapist plays a key role in helping the patient define subjective functional goals for the surgery. The Canadian Occupational Performance Measure (COPM) is an excellent way to determine outcome measures as it looks at patient performance, satisfaction, and performance in areas of self care, productivity, and leisure. Filling out the COPM with your patient allows you insight as to what is important to your patient, and clues you in on meaningful activities. You, in turn, can introduce these activities later as part of your therapeutic intervention. Another alternative evaluation form is the Patient Rated Wrist Evaluation (PRWE) which subjectively rates both pain and function on a scale of 1-10. The functional tasks listed can help to elicit more information from your patient regarding activities of daily living and work tasks in which he seeks to gain competency.

8. Activities

Knowing what is important and meaningful to your patient helps you plan the appropriate activities to keep him focused and involved in therapy. It shows that you value him as a person and want to create an individualized and tailored therapy program just for him. Always begin with simple activities of daily living and encourage incorporation of these tasks into the daily routine. Introduce leisure activities and make therapy fun for younger and older patients as well. Our clinic now utilizes many different children’s toys and games in our functional activities (figure 3). You will be surprised when you realize the various grip and holding patterns required for playing cards, memory games, building blocks and more. Progress the therapeutic intervention along to work simulation tasks, (fig. 4) even without heavy weights or resistance, in order to gain familiarity with the active range of motion required.

9. Facilitation techniques

Facilitation refers to the process of getting the donor muscle to contract with its new insertion, thereby performing the desired function. Sometimes this occurs easily for the patient, especially if he was able to isolate and contract the donor muscle prior to surgery. But for most patients, facilitation requires concentration and patience. Initially, simple

Continued on page 13
place and hold exercises (figure 5) are usually performed for short periods. For example, following tendon transfers for wrist extension, place the patient’s wrist in an extended position, and have him hold it for ten seconds initially. The donor muscles fatigue rapidly! Aim for short sessions of facilitation and fewer repetitions of good strong contractions. The patient builds up endurance gradually for repeated exercises. Activate the donor muscle in its previous function along with its new function. For example, following transfer of Pronator Teres to ECRL for wrist extension, have the patient pronate their forearm while simultaneously extending their wrist (fig. 6).

Practice this maneuver to reinforce the connection.

Other facilitation techniques include using visual and verbal cues to perform the desired action, holding objects in the desired position and giving resistance to the donor muscles.

10. Strengthening

Strengthening is initiated only after the patient can readily contract the donor muscle and move the specific joints easily. The patient must be able to perform good steady contractions without rapid fatigue before resistance is added. Try to eliminate compensatory movement patterns as they interfere with the transferred muscles’ actions. Promote normal grasp and release patterns of function as much as possible. Passive range of motion and facilitation exercises should be continued as patients learn to control the donor muscles.

continued on page 15
LEARN and EARN

EHT has a FREE gift for our Valued Readers!

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Test Your Knowledge... POP Quiz!

1. What is the goal of tendon transfers?
2. The surgeon selects the donor muscles based on what principles?
3. According to Debby Schwartz, what two tools does she recommend in helping the patient define subjective functional goals for the surgery?
4. Facilitation techniques refer to what?
5. List some facilitation techniques Debby discusses in this article.
6. When should strengthening be initiated?
7. True or False: It is not always essential to regain full wrist flexion after tendon transfers for wrist extension.
8. List the three phases of tendon transfer rehabilitation.
9. True/False: The patient must have a solid understanding of the entire process and timing of surgery and rehabilitation.
10. Name four of the ten tendon transfer fundamentals.

Answers on page 21
Motion exercises can be introduced at this time, but only if necessary for specific activities. For example, it is not always essential to regain full wrist flexion after tendon transfers for wrist extension.

Working with patients after tendon transfer surgery requires your innovative input! Here is where you utilize your background knowledge of anatomy and kinesiology, and mix in your activity analysis and creativity to construct appropriate and meaningful therapeutic sessions. Patients begin to see progress gradually so it is essential to stay positive and focused. Tendon transfers really do succeed to enhance function. It is important to realize that you are an essential part of the process! Enjoy the challenge and take pride in your role as an active participant!

Deborah A. Schwartz has been an Occupational Therapist for 21 years, specializing in hand therapy for 18 years. Her specialty is working with tendon transfer patients. In 2004, she presented two talks on Tendon Transfer Rehabilitation at the International Federation of Societies of Hand Therapy conference in Edinburgh, Scotland. She has also presented on this topic at the Philadelphia Hand Meeting and at the ASHT meeting in Charlotte, NC in 2005. Her article, “Tendon Transfers for Enhanced Wrist Extension: A Case Report” was recently published in the British Journal of Hand Therapy. Ms. Schwartz is the 2004 recipient of the Evelyn Mackin Traveling Hand Therapist Award. She traveled to Norway and Great Britain where she visited hand therapy clinics and presented on tendon transfers and hand therapy in America. An article about her experiences will be published in an upcoming Journal of Hand Therapy.

Ms. Schwartz currently works at a private hand center in Marlton, New Jersey. She is very committed to international hand therapy topics and has recently joined the ASHT’s international committee.

EHT wants to thank Debby for her inspiring and informative article.
Splinting Tips and Tricks from Nancy Falkenstein

**TIP:** I have found prefabricated outriggers save me time. They simplify fabrication of custom fit dynamic hand splints while allowing me to implement my knowledge and creativity.

**TIP:** I like to use the dynasplint MPJ extension splint to regain extension of multiple digits following Dupuytren's release. It is comfortable for the patient and effective.

**TIP:** See photo for a nice home splint when battling intrinsic tightness -- fabricate an MPJ extension block splint in slight hyper-extension, allowing full IPJ flexion. This will allow for the intrinsicis to stretch while performing active gliding. You will love the results and so will your patients.

**TRICK:** When splinting over bony prominences, apply a piece of padding to the bony area before molding. When splint is hard, remove the padding from your patient's arm and secure it in the "flared" area of the splint. This creates a nice lining for a potentially troubled area.

**TIP:** For ease of adjusting tension on dynamic splints, I recommend using a slip knot. The slip knot allows the patient and therapist to adjust the tension and length of the traction in one easy step. This eliminates having to re-thread, readjust tension/dynamic line, or re-knot.

Visit the site listed to learn how to tie a slip knot: [http://www.indoorclimbing.com/Slip_Knot.html](http://www.indoorclimbing.com/Slip_Knot.html)
Q: Are all tendon transfers immobilized between 3-4 weeks or are some mobilized sooner or later? If so, which ones are mobilized sooner or later and why?

A: The majority of tendon transfers are immobilized for 3-4 weeks, allowing for the healing of the repair site and surrounding tissues. Although tendon transfer surgical sites are well planned and strong repairs, this immobilization period is essential as the repair gradually decreases in strength and is most vulnerable at about two weeks afterwards. It is important to protect the transfers throughout this phase. Always check with the surgeon regarding the quality of the tendons utilized and the strength of the repair. Each surgeon will have specific protocols based on the tendons used and the patient involved.

Q: What are the most common tendon transfers you see in your clinical practice?

A: The most common tendon transfers I see in my clinic are the following:

- Opponensplasty: Flexor digitorum superficialis (FDS) of the ring finger or the Palmaris Longus (PL) tendon is transferred to Abductor pollicis brevis (APB) to restore opposition. This is often seen with advanced cases of carpal tunnel syndrome.
- Extensor indicis (EIP) to Extensor pollicis longus (EPL): This transfer is indicated with ruptures of EPL that occur with rheumatoid arthritis or following wrist fractures.
- Transfers for radial nerve palsy after humeral fractures. These transfers include muscles for powering wrist extension (usually Pronator teres (PT) to Extensor carpi radialis longus (ECRL) and Extensor carpi radialis brevis (ECRB); muscles for finger extension (Flexor carpi ulnaris (FCU) to Extensor digitorum communis (EDC); and muscles to restore thumb extension (Palmaris longus (PL) to Extensor pollicis longus (EPL).

Q: When is it prime time for the surgeon to perform a tendon transfer after nerve injury? In other words, how many months post injury is a transfer usually performed?

A: After a nerve injury, an appropriate amount of time is allocated for nerve repair, healing of the surrounding tissues and possible nerve regeneration. During this time, positional splinting is used to replace the function of the denervated muscles. Joint mobility is maintained to prevent contractures. If contractures develop from lack of appropriate splinting, these must be addressed prior to surgical intervention to restore muscle power. So it is impossible to state before hand when tendon transfers will be performed. Many aspects need to be taken into consideration. It is safe to say that most surgeons would wait about four to six months before exploring the possibility of additional reconstructive surgery.

Q: When a patient has a complicated multiple nerve injury, does the surgeon perform transfers in stages? Please share an example or two.

A: There are cases where reconstructive surgery will be done in stages. This is demonstrated in the care of patients with tetraplegia. After spinal cord injuries, these patients are often left with multiple deficits in upper extremity function. Yet upon evaluation, certain muscle can be transferred without causing additional functional deficits as other muscles remain intact.

An example of this would be a young male spinal cord patient who lacked elbow extension and pinch ability due to his injury at C6-C7. First, the Biceps to Triceps transfer was used to power elbow extension. A year later, the Brachioradialis (BR) muscle was transferred into the Flexor pollicis longus (FPL) for active pinch. The reason for the delay was simply scheduling around school and summer vacations.

Children with Cerebral palsy might also face the possibility of multiple reconstructive surgeries. Tendon transfers are often used to power enhanced wrist extension via FCU (Flexor Carpi ulnaris) and ECU (Extensor carpi ulnaris) transfers to ECRL and ECRB. Later, additional surgeries might be performed to overcome elbow flexion posturing, and/or extensor thumb adductor posturing. The staging allows for adequate healing and retraining of muscles, and time for the patient to return to their normal routine before the next phase.

Continued on page 18
Q: Do you see opponensplasties routinely performed with carpal tunnel releases?

A: Opponensplasties are often performed with carpal tunnel surgery when warranted by atrophy of the thenar muscles and loss of opposition and function. I would not say they are done routinely as more and more patients are seeking earlier surgical relief of their carpal tunnel symptoms, hopefully before significant muscle atrophy occurs.

Q: What tendons are most commonly used for transfers for claw hand, ape hand and other commonly seen palsies?

A: Ulnar nerve palsy can result in the “claw hand” deformity. The resultant intrinsic plus position (lack of active flexion of the MCP joint and extension of the IP joints) is treated by several different tendon transfers. The Stiles-Bunnel Procedure uses the FDS tendon to the ring finger (and often a second finger as well). Slips of the FDS tendon are attached to radial incisions on each digit to either the lateral band or the lateral aspect of the proximal phalanx. The hand is immobilized with the MCP joints in flexion while the transferred tendons heal.

Another method is called the Brand Procedure. Here, the ECRL tendon with a graft from the Palmaris longus is routed either through muscle or dorsally, divided into four slips and inserted into the radial lateral band of the long, ring and small digits and the ulnar lateral band of the index, pulling the proximal phalanges into MCP flexion. Median nerve palsy results in the “ape hand” deformity where the thumb loses its ability to oppose. As mentioned above, common muscles for opponensplasty are the palmaris longus tendon or FDS to the ring finger.

Common tendon transfers for Radial nerve palsy were previously mentioned.

Q: Do you use biofeedback after tendon transfers? And if yes, when?

A: Biofeedback can be very helpful after tendon transfers when the patient is having trouble isolating a specific muscle. The electrodes provide auditory and/or visual input signaling correct or incorrect muscle activity. I know that the pediatric
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JAS STATIC PROGRESSIVE STRETCH VS. DYNAMIC SPLINTING

<table>
<thead>
<tr>
<th>JAS SPS Therapy</th>
<th>Dynamic Splint Therapy</th>
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<tr>
<td>Manually adjustable constant positioning provides stress relaxation loading</td>
<td>Constant tension system provides creep based loading</td>
</tr>
<tr>
<td>Fulcrum positioned to prevent joint surface loading</td>
<td>Fulcrum positioned across joint, creates joint surface loading</td>
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<tr>
<td>1.5 hours daily treatment time</td>
<td>8-12 hours daily treatment time</td>
</tr>
<tr>
<td>7-10 weeks average total treatment time</td>
<td>12-26 weeks average total treatment time</td>
</tr>
<tr>
<td>Devices work bi-directionally</td>
<td>Most models work in one direction only</td>
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<tr>
<td>Custom fabricated devices</td>
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population enjoys the challenge of biofeedback. However, often the surface electrodes used are large and not specific enough to pick up single muscle contractions. Theoretically, biofeedback could be used as soon as muscle retraining begins. However, it is important for the patient to experience some degree of success so as not to get easily frustrated. I would use biofeedback with caution in the early stages of retraining.

Q: Do you use neuromuscular electrical stimulation after tendon transfers? And if yes, when?

A: I have found neuromuscular electrical stimulation (NMES) to be particularly helpful in the strengthening phase. The patient can now isolate the muscle easily, but fatigue sets in quickly. NMES allows for increased repetitions, provides a timing sequence of contractions and is easily tolerated. I typically do not include NMES until six weeks after surgery, although some clinics might incorporate it earlier.

Q: Do you use any modalities after tendon transfers? And if yes, when?

A: When mobilization begins after 3-4 weeks, I add heat modalities such as heat packs, warm soaks and/or fluidotherapy prior to beginning active exercises. I also add ultrasound if the surgical scars are adherent or particularly sensitive and tender. These modalities are easily tolerated and allow for tissue healing, increased circulation, and increased pain tolerance, prior to active motion and activities.

Q: Do you have any good references for those interested in learning more about tendon transfers that you can recommend?

A: The following are excellent resources regarding tendon transfers:


I would also like to add my recently published article on tendon transfers with Cerebral palsy to the list!

1. To rebalance the muscles and hold exercises and A/AA ROM exercises
2. The muscle excursion and its direction of pull
3. The Canadian Occupational Performance Measure (COPM) & Patient Rated Wrist Evaluation (PRWE)
4. The process of getting the donor muscle to contract with its new insertion, thereby performing the desired function
5. Facilitation techniques include using visual and verbal cues to perform the desired action, holding objects in the desired position and giving resistance to the donor muscles as well as place
6. After the patient can readily contract the donor muscle and move the specific joints easily
7. True
8. Phase 1: Immobilization
   Phase 2: Mobilization
   Phase 3: Strengthening
9. True
10. The 10 fundamentals:
    • Pre-operative Therapy
    • Patient Education and Conditioning
    • Patient History
    • Protocol
    • Donors
    • Splinting
    • Functional goal setting
    • Activities
    • Facilitation techniques
    • Strengthening

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Upon completion qualifies for KTA Level 2 Membership

The KT2 course builds on material learned in KT1. During this 8 hour class, the instructor will introduce the six Corrective Techniques (Mechanical, Functional, Space, Fascia, Ligament/Tendon, and Lymphatic) and discuss their application in a variety of clinical conditions. During lab sessions, attendees will have ample time to practice applying these techniques to a variety of upper and lower body conditions. Upon completion of this course, attendees will be able to discuss and apply the KT Method to orthopedic & neurological conditions.

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Please visit our website or contact The Kinesio Taping Association for detailed information

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It’s Not Just Sitting!

We all know that office ergonomics is a critical area and is becoming an area of expertise. In fact, therapists who are experts in seating and ergonomic workplace design are working as industrial consultants for seating considerations. In this issue, we are going to look at some of the specifics of seating and how it effects the worker.

We know from research that disc pressure is increased when sitting vs. standing. From radiographs we know when sitting the pelvis rotates backward and the lumbar spine flattens which may cause disc herniation. And we know that disc pressure is greatest when sitting and slouching are combined. So our job is to promote correct sitting posture and comfort for the employee while increasing productivity and reducing risk of injury. WOW! That can be a challenge. Although there are many ways to accomplishing this, including: psychosocial, administrative support, and the office equipment itself. We are only going to touch on some aspects of the office worker’s sitting posture.

We know that the “proper axial relation between the thorax and the pelvis must be restored by bringing the upper trunk over the hips”. (Jacobs 223) One common area of concern is the universal use of a standard lumbar support. When the worker’s job requires close table top, bench work, or writing tasks, the lumbar support positioned at the seat base will increase the distance from the employee to the work surface promoting poor posture, such as: neck flexion, compensation of upper body, & increased stress on muscles, ligaments, & tendons. We want to put the support more at the ischial tuberosity to balance the pelvic muscle groups allowing the body to be positioned over the ischial tuberosity (like in horseback riding) and not behind the seat base. There are many variations of lumbar supports, wedges and back slings. You must know the duties of the worker, chair functions, and general sitting habits of the employee to accurately recommend a lower back support. Also, there are specially designed chairs to help alleviate the mentioned problems by having built in support and meeting specific specifications.

Legs:

A chair that is too high or a seat pan too deep can cause compression of the sciatic nerve and increase leg and foot swelling. If the chair is too high this promotes forward leaning and increases stress on the back & soft tissues. One easy way to fix this problem is to adjust the seat height so the feet are firm on the floor or footrest. Ensure there is 1 inch or a fist between the edge of the seat and the back of the knees. Encourage the employee to take frequent movement breaks to avoid lower body swelling.

Typical problems with chairs:

- Backrest not easily adjusted
- Hard to turn knobs
- Awkward body postures required to adjust the seat
- Armrests that are too wide, too low or too high
- Backrest not used and worker sits forward unsupported on the seat
- Seat pan not the proper size causing feet to dangle

Solutions to typical chair problems:

- Easily adjustable seat height with pneumatic pedestal base allowing one hand adjustments
- Easily adjustable backrest to support the lower spine vertically (height) and horizontally (forward & backward)
- Independent seat forward & backward tilt
- Waterfall (curved) seat pan edge
- Proper seat pan depth to accommodate the buttocks
- Adjustable armrests ensure they are small & low enough to fit under the work surface & support the back
- Seat cushion is appropriate for employee’s build and comfort
- Employee training is critical to ensure familiarity with the features and adjustment of the chair

So looking at a few of the many facets of seating you can appreciate that proper sitting is a complex area of the work station. It is not just sitting but proper sitting that is critical to promote comfort, productivity and reduce the risk of injury.

Like all areas of expertise it takes on-the-job training combined with knowledge and skill to perfect your style. For more information on this topic read: Ergonomics for Therapists, 2nd ed by Karen Jacobs, Butterworth & Heinemann 1999.
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