"String of Pearls": Twenty-Five Years of Learning, Observations, and Practice in Clinical Hand Therapy

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Georgiann F. Laseter, OTR, FAOTA, CHT

The good news about being awarded the Nathalie Barr Lectureship is that it is the highest professional honor bestowed by our society. The bad news is that you have one entire year to think about delivering an address that everyone expects to be insightful, educational, and inspirational. I hope you are not disappointed.

Few therapists of my advancing age and experience still do purely clinical work with patients on a full-time basis. My professional life has been dedicated to patient treatment and (hopefully) helping advance the professions of occupational therapy and hand therapy through volunteer service. I have had the great fortune of working with and being mentored by accomplished hand surgeons and hand therapy peers—all of whom have enriched me as a person, elevated me as a professional, and adorned me with their pearls of wisdom. Many of you, my heroes and mentors, are here today.

I find the origins of expressions fascinating. I'd like to share some of my research on the subject. We've all heard the expression "pearls of wisdom" and other variations such as "Here's a pearl I learned" or "That's a real clinical pearl."

Pearls in the literal sense are lustrous gems produced by bivalve mollusks. Unlike other gems, pearls need not be cut, faceted, or polished. The pearl is an abnormal growth created by the invasion of a minute particle of foreign material such as a tiny grain of sand. Layers of the nacreous material—also known as mother of pearl—lining the mollusk shells coat the irritant and eventually produce the pearl. There is some parallel here to the way in which the human tissue responds as it attempts to "wall off" a foreign body in the hand. Unfortunately, the end result isn't nearly as lovely as the pearl, and the rest of the tissue can't be discarded like the mollusk!

Georgiann F. Laseter, OTR, FAOTA, CHT, recipient of the 2001 Nathalie Barr Lectureship.

There are variations in color, size, and quality of pearls. Since biblical times, pearls have been appreciated by discerning individuals as goods having great value and small size. *Job*, one of the oldest books of the Bible, mentions that the pearl is of rare beauty and high value and must be of great antiquity. Shakespeare's *Antony and Cleopatra* (1606) cites the pearl as the "treasure of an oyster." A passage in *The Book of Matthew* recognizes the waste of such a valuable commodity with the statement, "Neither cast ye your pearls before swine lest they trample them under their feet." This expression has been used from Matthew to Dickens and beyond. It then follows that sage

advice and adages are characterized as "pearls of wisdom."

Some of the following observations and so-called "clinical pearls" are the product of self-discovery during years of patient treatment. Skilled clinicians have imparted many others. Some of the most valuable pearls have come from lessons learned from poor outcomes. Bad results are excellent teachers, and nothing can ruin a good result like long-term follow-up!

None of the thoughts I have to share with you today are revelations or new ideas, but rather a discussion of what I believe to be the foundation of good patient treatment—the ability to apply "book-learning" and theoretical knowledge to patient treatment with an approach based on common sense. Julio Taleisnik, M.D., defines common sense as that which "simply implies a good, practical approach, the combined tact and readiness to deal with the everyday affairs of life, and a natural condition enhanced by experience, ultimately resulting in good judgment."[1]

One of my most recent epiphanies occured at the 1999 Philadelphia Meeting. Philadelphia—you know—is *the* hand therapy capital of the world. The faculty chosen for these meetings is very knowledgeable. There is always something new to learn, even for those of us who are doing the teaching. The people in charge of the Philadelphia meeting also make quite sure that the faculty is well-fed and entertained. One evening, the faculty returned to the hotel after a lovely dinner. A group of us decided that we had not yet had quite enough to drink and were enjoying the last libation of the evening in the hotel bar. That day I had given three presentations on my favorite clinical interest, distal radius fractures. All of sudden, I hear a rather inebriated voice saying, "Georgiann Rocks!" I look up to see a handsome young man ("young" meaning that I am chronologically capable of being his mother) complimenting me on my talks and how funny he thought I was. That's all well and wonderful, but, I asked him, "Did you actually *learn* anything?" His reply was "Duh—of course, because I was *awake*!"

It was an epiphany because I realized that I was now communicating with a generation of therapists and even patients who want to be entertained while being educated. They—many of you all—have grown up with visual and electronic stimuli at home, at work, and at school. Immediate feedback is expected. It led me to reflect on the development of my experience, communication skills and my knowledge base and how things have changed since I entered the profession.

The "Philadelphia epiphany" occurred at about the same time some of the "veteran" hand therapists in the Texas State Chapter of the American Society of Hand Therapists were asked to write a newsletter article on how things have changed in hand therapy during the past twenty-five years. This was an interesting process of reflection.

Of course, we all had something to say about reimbursement (not all of which was printable!). Our ability to diagnose certain problems is ahead of our abilities to carry out predictable, effective treatments. The global area of "wrist problems" comes to mind. I think back to early in my career when many patients complaining of wrist pain were dismissed after plain radiographs showed no abnormalities. The advent of sophisticated imaging techniques, such as bone scans, arthrograms, and MRIs, now enable the hand surgeon to pinpoint the problem. *Predictable* treatments are still evolving for problems such as TFCC tears, Kienböck's disease, and partial ligament injuries, to name a few. The search continues for the surgical course of action with the greatest potential for a good outcome with fewest complications.

Tendon sutures are stronger and cause less reaction, and internal fixation of the distal radius is becoming more predictable. The advances in technology have affected the types of problems we treat. There is more repetitive motion trauma and less mutilation trauma. Thanks to microwave ovens, flexor tendon injuries in the ring and small fingers resulting from trying to separate frozen pork chops with a knife are almost extinct.

I can remember when hardly anyone over the age of twenty exercised on a regular basis, when computers were big pieces of furniture housed only by the largest companies, and fax machines were a wonder—and this was only 15 or 20 years ago! People are doing more in less time, aging better, and have come to expect immediate responses. The advances in medicine in our lifetime alone are incredible, but it puts subtle pressure on us.

"Why"—my patient wants to know—"can't I play tennis six weeks after I broke my pinkie finger when someone who has had a kidney transplant six weeks ago is doing great?" Of course, what my patient is *really* asking is, "Why is recovery from this *insignificant problem* taking so long?" It is unfortunate that scar tissue has not adapted to the speed of electronic communications.

Since we have only limited impact on the time it takes to heal, reach scar maturation, and become functional once again, our role as educator continues to be our greatest asset—and challenge. This has not changed. It has become more important and deserves greater focus as we have to deliver our services:

- In a shorter period of time
- With fewer visits
- To a patient population wanting rapid results

- To scar tissue which resists our efforts to get it to respond to the satisfaction of the patients and insurance carriers alike.

With this as a preface, let me share some of what i have divided as anatomical, "big picture," and philosophical "pearls" with you.

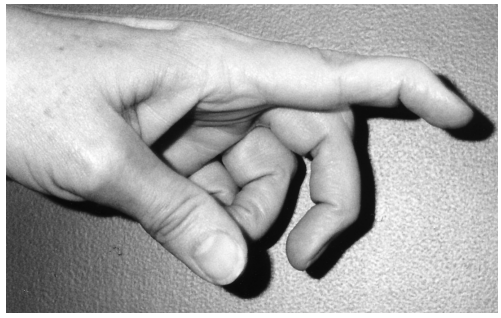

FIGURE 1. *Mallet finger deformity in a patient with a hyperextensible PIP joint. The insertion of the terminal extensor tendon at the DIP joint causes the volar plate of the PIP joint to stretch and creates more of a swan-neck deformity.*

Anatomical Pearls

One of our most important—and I think considerably underutilized—assessment tools is using the patient's opposite side for comparison for range of motion, grip and pinch strength, sensibility testing, and volumetric testing. It has been my observation that "normal" range of motion of wrists and thumbs can vary a great deal. Grip strength should be a comparison between left and right and not just a look at the "numbers." Observation of the texture, color, and temperature of the skin compared to the opposite side is also valuable in determining the presence of inflammation or sympathetic hyperactivty.

Early edema control is critical to functional outcome and prevention of long-term problems. I sometimes think we don't make as big an issue of this with patients as we should. We *know* it is important, and we seem to think that the patients should just internalize that information. I've discovered that many patients think that when the swelling goes away, their stiffness will also disappear. Au contraire! Just think about how many PIP joint flexion contractures could be avoided if digital edema was eradicated early.

It has taken me a long time to understand the intrinsic mechanism. Intrinsic function is needed for both precision and power movements in the hand. Beware after an injury as they are "control freaks" and quite sensitive. The intrinsic muscles are particularly vulnerable as the fluid encases the muscles and renders them ischemic and tight. Problems with tight intrinsics aren't always apparent. How many of you have ever had this happen? You are working and working to get flexor and extensor tendon gliding, and just about the time progress is being made, the intrinsic muscles go "not so fast—we're tight and we're mad! Just try and get better IP joint flexion without paying attention to us!"

Always look proximal. Many of the problems we are trying to address cannot be treated effectively because of proximal function. Some examples include mallet finger deformities in individuals with very hyperextensible PIP joints (Figure 1). DIP joint extension splinting alone is usually not effective because the problem with the insertion of the terminal extensor tendon is now causing the volar plate of the PIP joint to stretch and actually creating more of a swan-neck deformity problem. Splinting these patients requires attention to the lack of extension at the DIP joint as well as the hyperextension of the PIP joint (Figure 2).

PIP joint flexion contractures, especially in the small finger, are particular challenges. The contracted PIP joint usually has an excessively hyperextended MP joint (Figure 3). One approach to this problem is this type of splint which controls the MP joint hyperextension and applies static progressive pressure to the PIP joint without direct pressure over the dorsum of the PIP joint (Figure 4).

Poor ability to make a fist can be related to poor or absent independent wrist extensor function. Because the digital extensors originate on the dorsum of the forearm and cross the dorsum of the wrist on their way to the fingers, they can help extend the wrist. Full finger flexion cannot be achieved with this substitution pattern. This type of subsitution pattern is common after distal radius fractures and other wrist injuries. The wrist extensor muscles must be able to independently extend the wrist in order to regain flexion of the fingers and power grip.

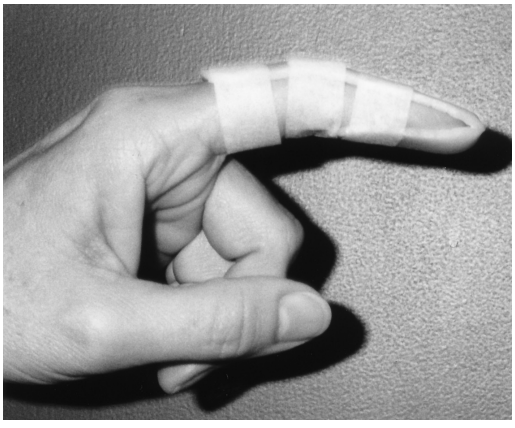

FIGURE 2. *Splinting of a mallet finger in a patient with a hyperextensible PIP joint requires correction at both the PIP and DIP joints.*

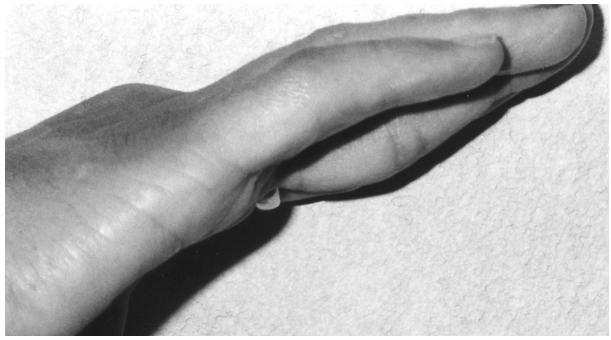

FIGURE 3. *Flexion contractures of the PIP joint in a small finger after PIP joint dislocation.*

The flexor digitorum profundus tendons in the long, ring, and small fingers are controlled by one muscle of common origin. If a patient has an injury to any of the ulnar three digits, the other two are at risk for getting stiff because it is anatomically impossible to fully flex them (Figure 5). The ring and the small fingers are particularly "married" to each other. Before focusing attention to the injured digit, first evaluate the passive range of motion of the other two digits. I have seen patients who wound up with three stiff fingers instead of one because no one explained this anatomical situation to them and the importance of passive ROM to the uninjured digits.

The index finger may be the single hardest finger to rehabilitate if it is the only one hurt. It is very easy for the brain to basically "divorce" it from the rest of the hand. Fine motor function can be accomplished with the long finger and thumb, and power grip is performed with the ulnar half of the hand. Full flexion of the index finger is rarely required in daily functional activities; therefore, patients with stiff index fingers need to be more specific with an exercise program to regain flexion. A fixed flexion contracture in an index finger PIP joint can impair hand function by basically "blocking" the opening to the rest of the hand.

For many situations requiring splintage of the wrist, dorsal and circumferential splints support the wrist better than volar splints and are also helpful in decreasing dorsal edema because of the even compression on the dorsum of the hand, wrist, and forearm. The distal ulna is most prominent when the forearm is pronated. There will be less difficulty in getting a splint comfortable over the distal ulna (and fewer adjustments you will have to make!) if you fabricate the splint with the patient's forearm pronated.

For a wrist that is already stiff in flexion or does not have good independent control of the wrist extensors, a volar splint is not the best choice as it migrates distally as the patient flexes the fingers, thus blocking finger motion.

Splinting is a very integral part of our work. Splints need to perform the function required, they must be as comfortable as you can possibly make them, and they must look as nice as possible. Would you be proud to wear a splint that *you* had made out in public? Take pride in your work, and improve your splint-making craft if it needs work—and you know who you are!

"Big Picture" Pearls

Managed care and the intrusion of insurance companies have drastically changed the delivery of clinical care. We have to pay as much attention to the business aspect of a practice as the actual treatment of patients. We are overwhelmed with paper work and are frustrated with treatment

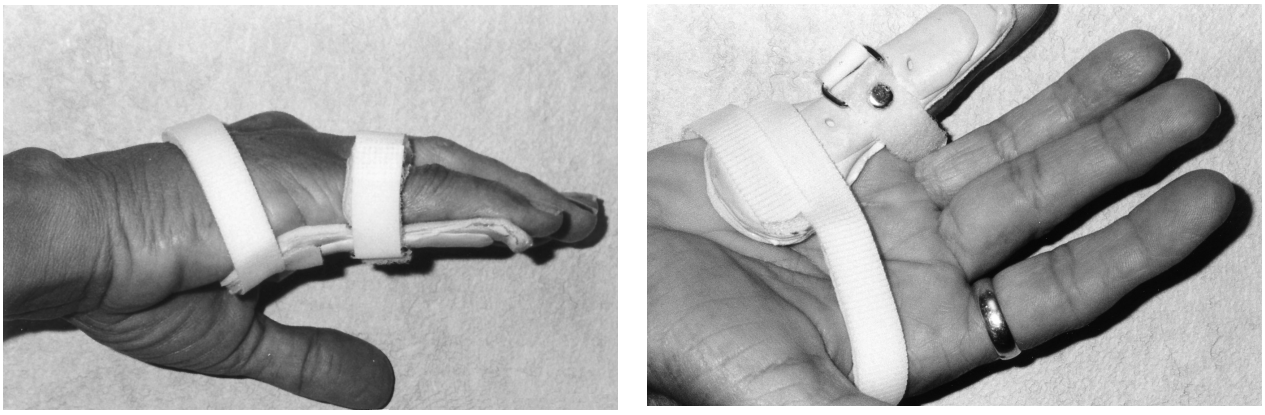

FIGURE 4. *A, One type of static progressive splint for PIP joint flexion contracture. B, Volar view shows how proximal portion of splint helps control MP joint hyperextension.*

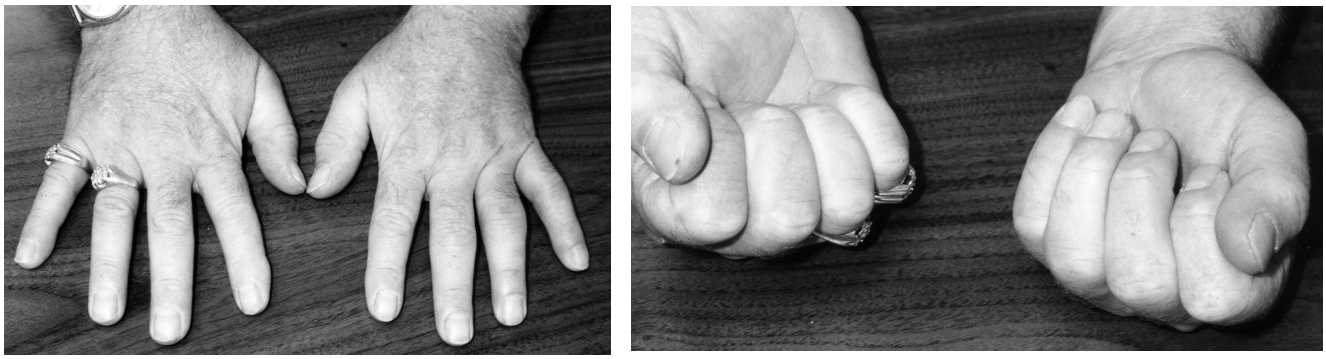

FIGURE 5. *A, Maximal extension of left hand in a patient 3 months after PIP joint dislocation of the ring finger. Note fusiform swelling, lack of extensor wrinkle formation, and flexion contractures in long, ring, and small fingers. B, Lack of full flexion in ulnar three fingers in the same patient.*

decisions being made by insurance clerks, case managers, or others with limited or no medical experience. Managed health care was to hold the promise of affordable, quality health care with good functional outcomes , but it has been a clinical and financial boondoggle. It has become more costly with frustrated health care givers and disgruntled patients. One of the well-touted premises of managed care is that it is supposed to keep health care costs down. But health care costs are rising again. Private expenditure for health care in 1997 was 3.1%, 6.5% in 1999, and the costs continue to rise at approximately 5% annually. The Health Care Financing Administration (HCFA) estimates that health care spending will grow at a rate of 6.8% annually and will reach $2.2 trillion by 2008. Analysts project that at the current rate, health care expenditures will consume 25% of the gross domestic product by 2030.2 With all of the other important issues facing this country, I think you would agree that spending one out of every four dollars is excessive.[2]

Here's another statistic to ponder. The United States spends annually 3.4% *more* than any other Western country on health care. Yet we are ranked 37th by a World Health Organization study in the quality of health care in industrialized nations.

Hand therapy is at the "bottom of the food chain" in health care as far as dollar expenditures, but we still need to do our part. Outcome studies are needed to validate the efficacy and frequency of our treatments. We need data to support even supposedly simple premises such as: "Do most post-op carpal tunnel release patients *really* need therapy to enhance their recovery?" And—to take it further—if so, "Do these patients do better if they have therapy with assorted modalities three times per week?" Everyone in medicine and the business of medicine is part of the problem; we all need to be part of the solution.[3] We have to be ethical enough to look past those questions, which are more important to the financial bottom line of our practices. If so, we will be able to support treatment with evidenced-based practice and not what we "think" works most of the time with "most" of the patients.

The September 17, 2001, edition of *U.S. News & World Report* details a new policy adopted by the *Journal of the American Medical Association* and other major medical journals to "not review or publish articles based on studies that are conducted under conditions that allow the sponsor to have sole control of the data or to withhold publication."[4] This policy statement was precipitated by publication of a drug study with six months of data. When the FDA reviewed the study several months later, it was determined that the study had actually lasted twelve months, but the drug company withheld the last six months of data because the full data pointed out a different result. The article goes on to point out the dilemmas of academic institutions and their financial associations with drug companies.

We need more—and better—science to support our practice and the art of our profession. We can be proud of the work that publisher Hanley & Belfus, our editor, and dedicated editorial review board do for the *Journal of Hand Therapy.* I'm sure no one here would disagree that research is important. However, it is unrealistic to expect that everyone is going to run out and do research—although that would be great. We can all, however, shoulder the responsibility with our publisher, editor, and editorial review board to improve the *journal* and ourselves as individual therapists to know the value and pitfalls of statistics in published research. Statistics provide only the simple picture of the data, but do not present the quality of the data.[5,6]

Philosophical Pearls

Perhaps some of you have heard me speak on treatment of

distal radius fractures. Maximum improvement from these fractures occurs at about six months for those with minimal or no complications. Studies have shown that more complex fractures requiring surgery do not reach maximum improvement until one year—or more—after surgery. We are treating these patients in a time frame not compatible with healing and functional recovery when therapy is limited either by numbers of treatments, a time limit on treatment, or a dollar amount for treatment. There are many other diagnoses and pathology we treat that do not reach scar maturation and functional recovery until after they are discharged from therapy.

What do we do about it? We have to become better educators[7] with a paradigm shift from what we can do "to" the patient to what the patient can do "for" himself and herself to achieve a satisfactory outcome. There's always more stuff that can be done "to" the patient instead of "for" the patient. Patient education is the epicenter of treatment. We have to help our patients understand their conditions and empower them in their rehabilitation.[8] To do so requires that we hone and adjust our communication skills so that we connect with every person in our diversified patient populations. We have to get better at targeting treatment and be ethical enough to disdain treatments that benefit the bottom line of the clinics more than the functional outcome of our patients.

Patient performance of home programs is a component consistent with a patient-centered treatment approach and is a practical and important part of shortened lengths of stay and reduced direct treatment time. Of greatest importance is that home programs involve patients in their own recovery and helps them take responsibility for their rehabilitation.

Think now about all of the materials—many of them written—that we give to patients to use in their home programs. Most of us use assorted drawings of desired movements with accompanying descriptive verbiage. A lot of these materials have been photocopied umpteen times and aren't even straight on the page. What kind of message does that send to our patients? The message I think it sends is: "I don't think much of this exercise program." At least it sure doesn't look like it!

We need to pay closer attention to our home program materials not only because of their appearance and the importance that they represent but also because of the inability of many adults to adequately comprehend the written word. The National Adult Literacy Survey published in 1993 found that approximately 25% of the adult population has profound difficulty with the written word such as reading bus schedules and reading and understanding poison warnings. An additional 27% has moderate difficulty. These people come from all socioeconomic and ethnic groups with the largest being Caucasian, native-born Americans.[9]

Poor readers are commonly intelligent and have learned to hide their literacy problems—even from their spouses and family. It is impossible to discern someone's reading ability through appearance or conversation. Patients who have difficulty reading will usually not volunteer this information because of the social stigma attached to it.

Since approximately one in four adults in the United States has very low literacy skills, it is important that we analyze our patient education materials with the goal of creating printed materials that are more usable. Avoid information overload—both verbal and printed. Prioritize your messages and make sure the most important points are covered first. This approach should also help those for whom English is a second language.

Writing simply is difficult especially for those who use language at advanced levels. Some suggestions to simplify and reduce reading level include:

1. Use one or two-syllable common words instead of difficult words; i.e., *broken bone* instead of *fractured metacarpal*.
2. Be consistent in use of terms throughout the material.
3. Avoid contractions, and abstract concepts.
4. Shorten sentences to 10–15 words .
5. Paragraphs should be no longer than six lines.
6. Use a conversational style, present tense, and active voice; i.e., *Do your exercises 3 times every day* instead of *Your exercises should be done 3 times per day*.
7. And—especially in consideration of those of us with aging eyes—use 12 to 14 point type.

Simplification of patient education materials encourages more interaction and involvement which in turn helps reduce anxiety and increase self-efficacy.[9]

Many people in medicine have forgotten that patients are *not* in their waiting rooms because they *want* to be there. Sometimes we get so caught up in the diagnosis, insurance authorization, and paperwork issues, that we forget our patients aren't exactly thrilled to have made our acquaintance. No matter how tired and out of sorts we might get, we must always practice the "golden rule" and try to treat each patient as we would want to be treated.

Some of the diagnostic problems that we might consider to be "not a big deal" or at least less

significant than some other things we treat are, in fact, a very "big deal" to the patient who has been referred to us for help. Remember the difference between major and minor problems: they're major when they happen to you and minor when they happen to anyone else!

Make sure your receiver works as well as your transmitter—in other words, be as good a listener as a teacher . The questions, fears, and treatment goals of the patient may be different than your assessment. A partnership requires mutual respect and understanding. If you are going to get the patient to "buy in" to the treatment plan, you have to establish rapport, gain trust and confidence, and make the patient feel as if you are listening as well as taking command of the situation—and all of this has to occur on the first visit!

Make sure you are sitting in a relaxed position with eye contact with the patient. This may seem so basic that it doesn't warrant being mentioned. Think about the "golden rule" and how you would feel if your therapist was standing by your treatment table looking down on you —and many times that therapist looks as if his or her interest is directed to several other things in the room. Would you feel as if you were being given adequate attention? I think it is sort of like being at a cocktail party and trying to have a conversation with someone who is constantly looking over your shoulder for someone more interesting or attractive. Even if you don't work in a situation where patients are treated one-on-one, you have to develop the ability to sincerely make the patient feel as if he or she is the *most important* person in the room.

Fortunately, hardly anything we treat is life-threatening. It is, however, "quality of life-threatening" and the nuisance factor is very high. We must always remember that our patients can be angry, frightened, in pain, and definitely upset by the sudden loss of independence that accompanies many of the problems we treat. Treatment becomes even more of a challenge in those patients traveling with the "baggage" of low emotional intelligence, dysfunctional family situations, litigation, anger management problems, and any number of other personal issues over which we have no control.

I'd like to share an experience that left a lasting impression on me. I spent the first five years of my career in rehabilitation treating patients with spinal cord injuries, strokes, and head injuries. The director of physical medicine and rehabilitation at this one facility was herself a C5 quadriplegic. "Dr. K—as we called her—wasn't exactly Miss Congeniality herself. One day in our patient staffing meeting, we young, altruistic therapists were bemoaning the fact that a new admission—a soybean farmer from Louisiana who had sustained a C4–5 spinal cord injury in a farming accident—was totally uncooperative with any of the treatment goals and basically just refused to try and do anything. Dr. K patiently listened to all of us as we individually reported the difficulties with this patient. Dr. K then raised up in her wheelchair, leveled her gaze at us, and proclaimed, "What you all have failed to learn is that when you take a S.O.B. and break his neck, you wind up with a S.O.B. with a broken neck!"

That was a very clear message that has helped me with patients for many years. If a person was a really big jerk *before* he broke his wrist, this injury is probably *not* going to improve his disposition! Some people have never figured out that they make it really difficult for someone to try and help them. I don't have any good legal strategies for dealing with these obstreperous patients who sap our emotional energy other than trying not to take anything personally, put on your "game face," and do the best you can with whatever sense of humor you can muster.

Our patient populations are very diverse. People of all ages, races, cultures, educational levels, and socioeconomic status come to us with upper extremity problems and encounter each other in our practices. People have a tendency to "hang with their own kind." I often think that there couldn't help but be fewer racial problems in the world if more people did the work that we do. I know for a fact that in several circumstances that I have been the first white person to ever touch a person of color. It is gratifying not only to be able to help someone but to exchange understanding and trust on another level of humankind.

In conclusion, I would like to again thank the society for this very great honor. It has been a pleasure to share these thoughts with you. Even if you didn't glean anything new, hopefully it has stirred some of your thought processes.

Before I go, I would like to recognize my husband, Don, without whose love, dedication, and support I would not be standing up here today. His pride in our profession and my achievements has been unwavering.

This talk today has been in my head and my soul for a very long time because these thoughts are such a part of my belief system. And then—everything changed on September 11—for all of us. I decided to continue as I had planned but I grappled with it for a long time because all of a sudden it didn't seem too important any more. But we are the foot soldiers in the scar wars. It's what we do—and we are good at it. The scar never sleeps, and it has no soul or no conscience. We should all be honored and proud that we

have shown up to participate in this meeting and elevate ourselves as professionals and in this process, fight the terrorism that attempts to paralyze this great country. May God bless each and every one of you, and may God bless the United States of America.

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