

A GLIMPSE INTO HOW GREG ROSKOPF DEVELOPED MAT®

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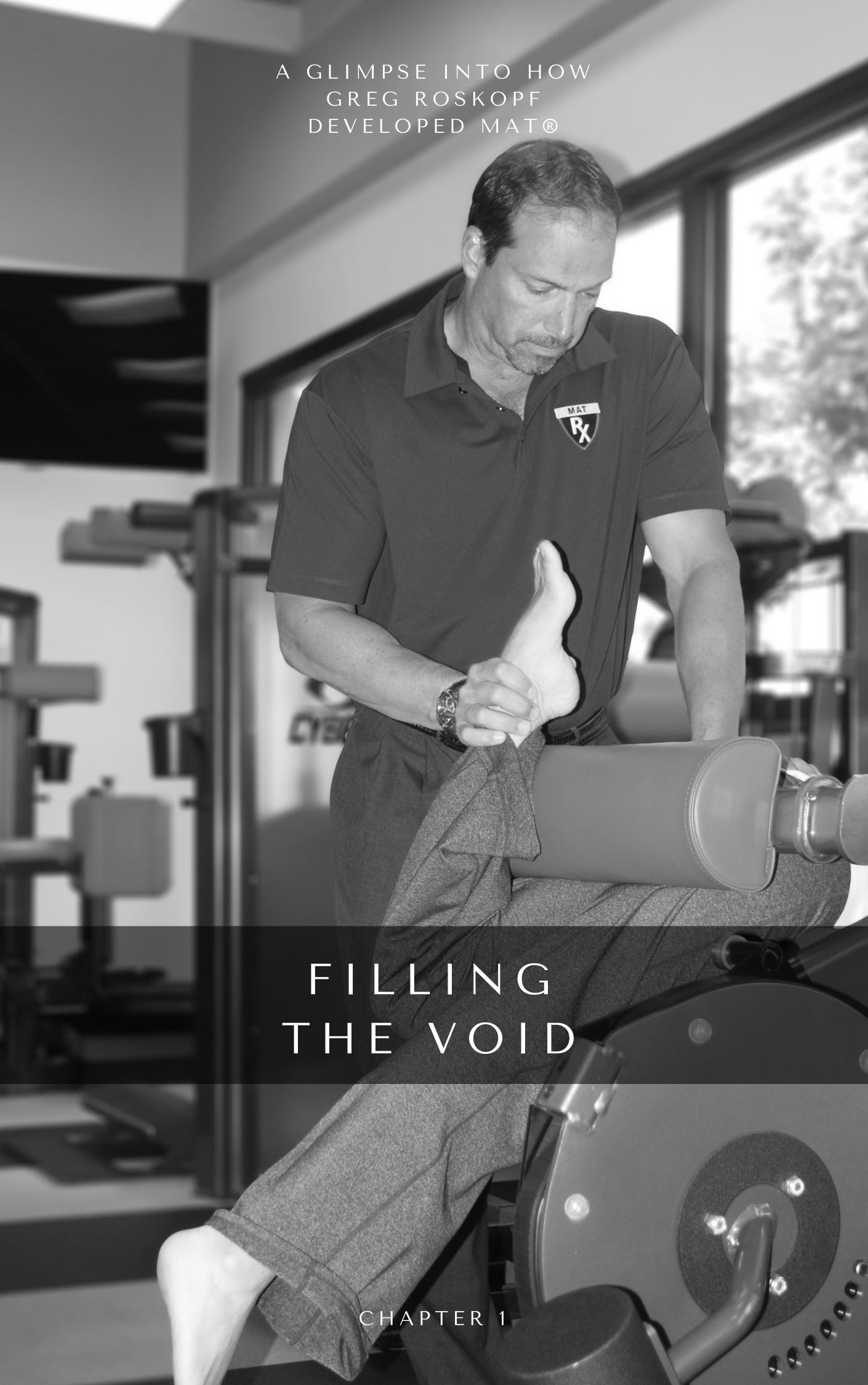
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Key Turning Points in the Development Process



PROFESSIONAL FRAME

Greg Roskopf, the developer of MAT®, holds a Master's Degree in the Health and Fitness field. Early on, Greg's work was focused in the category of general fitness with a primary emphasis on athletic strength and conditioning. His early experiences as a strength and conditioning specialist aligned him with medical providers from a variety of clinics. He worked alongside physical therapists where he observed exercises being used in a clinical setting to correct human performance issues, treat dysfunction, and increase athletic performance. As Greg honed his craft and started seeing success with his clients, his career began taking him towards his objective: to be recognized as the functional fitness expert in the health and fitness industry by consumers, as well as within his professional peer group.

As a non-medical provider working in a medical setting, Greg began learning about clinical techniques that were not readily available to non-licensed medical providers. It is important to remember though, that Greg's role was best described as an exercise physiologist—not a physical therapist. As he explored techniques from both of these avenues, he realized the significant gap between the two knowledge bases. As you might expect, the medical knowledge base exceeded his own in some critical areas, specifically anatomy and pathology.

Having earned a Master's Degree in the Health and Fitness field, Greg had accumulated a vast set of knowledge. As he explored new techniques and was experimenting with powerful modalities, he realized he needed to develop clarity in his professional role, responsibilities, and identity. Thus, he began his search to find courses to increase his knowledge, ultimately creating a methodology and set of techniques that were appropriate within his scope of practice and target population.

PROFESSIONAL METHODOLOGICAL AND PRESCRIPTIVE ENVIRONMENT

At this point in Greg's journey, the fitness and rehabilitation communities were focused on the evaluation and improvement of joint motion via several techniques. The belief was that limits or losses in joint motion were the cause for most dysfunctions, pathology, and pain during movement. Greg learned to assess joint range of motion (ROM) using goniometry.

Eventually, this led to looking at "end feel" through passive ROM interpreted by the examiner. These tools were used to detect joint motion issues. This was then followed with assessing motion on the other side of the body as a comparison of joint motion. This helped to identify abnormal losses in motion.

Greg's conclusion—as well as many practitioners'—was that observed joint motion limitations were caused by hyperactivity of the muscles acting across the joint. This hyperactivity resisted the body's joints from moving through and into their normal end ranges.

Greg's search for additional education to expand his working knowledge exposed him to Paul Chek lectures that were based on Vladimir Janda's work in somatic dysfunction and posture. This perspective established a hypothesis of "Tightness: Weakness". This hypothesis posited that agonist/antagonist muscle pairs (the agonist being "weak" and its antagonist being "tight") explained the causal relationships of postural deviations and any resulting somatic dysfunction.

Janda established "upper cross" and "lower cross" syndromes. These syndromes refer to the tightness and weakness pairings as muscular imbalances that explain postural observations of abnormally rounded shoulders and lumbo-pelvic orientation based against normative ideals of standing posture.

FILLING THE VOID

The conclusion was that agonist/antagonist muscular imbalances create dysfunction that leads to disease, injury, and pain. This perspective led to an interventional prescription of passively or actively stretching what a practitioner assesses as tight (hyperactive), and strengthening what is weak. A practitioner bases these stretches by observing deviations in the standing postural relationships between body segments.

To continue his learning, Greg attended lectures and workshops of physical therapists Richard Jackson and Gary Gray. Jackson's work focused on identifying and correcting joint dysfunction by a more isolated process of joint manipulation. Gray emphasized identifying and correcting joint dysfunction in a more integrated and systematic process of joint manipulation through active motion. Additionally, he indicated that all movement occurs along triplane motion and that weaknesses will be demonstrated in the transverse plane. Gray coined the terms "MoStability" and "Chain Reaction" as descriptive terms for his perspective. Gray believed that many movement dysfunctions could be addressed through what he referred to as "functional movement drivers".

Greg learned and began applying this perspective with his current evaluative and corrective strategies. This included various forms of stretching, mobilizations, and even the implementation of orthotics. The challenge was applying these techniques through his strength and conditioning practice while working in a physical therapy environment. He sought ways to evaluate and correct movement performance issues, but felt these issues limited his clients' exercise progression and athletic potential.

Greg embraced Gray's approach and began working to translate Gary Gray's perspectives and process to the health and fitness world.

One of Gray's major tenets was focusing on foot and ankle pronation/supination mechanics in one's walking gait and this mechanical process's influence on the rest of the body. An important assumption regarding somatic dysfunction was that where hypermobility of joint motion was observed, ligament laxity was present in that joint. This created excessive uncontrollable ROM (i.e. overpronation). Greg learned to assess an individual's foot and ankle mechanics using this lens and prescribed corrective exercises and orthotics to correct the perceived dysfunctions.

Another critical professional perspective of the time—and one that persists today—was that abnormal bone structure caused observed asymmetrical joint/limb motion (e.g. femoral retroversion, or humeral anteversion). This proved to be a powerful and persistent associative bias in the interpretation of bilateral asymmetrical motion and movement limitations.

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One of the prevailing paradigms was that in the absence of hypermobility, a loss of joint motion could be attributed to the tightness of the tissue — the origin of which was primarily attributed to muscle. This was referred to as "hypomobility". Sherrington's definition of reciprocal inhibition was being used to rationalize that tightness was the problem. The excessive excitation of specific muscles needed to be reduced directly. The resulting prescriptive intervention was that the muscle tightness needed to be released or relaxed.

The axiom: "Local symptom=local problem=local treatment" drove diagnostic and interventional strategies. The interpretation by clinicians of the multiple symptoms in an individual system was reduced to a disconnected symptom-by-symptom treatment process. Gary Gray's perspective was the only one Greg encountered that tied local dysfunction to remote symptoms elsewhere in the body.

During this time, Greg was using postural assessment, specific joint ROM evaluations, manual stretching, and concentric/eccentric-based strengthening techniques to improve movement performance in clients. This process produced good results, but there were individual circumstances that did not respond to these techniques.

GREG'S PROFESSIONAL OBSERVATIONS APPLYING THE VARIOUS SKILLS

Over time, Greg became frustrated because he applied many of the elements of the techniques he was learning and began to observe:

- Inconsistency within the literature regarding joint ROM normative values.
- Techniques (stretching, joint mobilizations, thermal, exercise) to improve joint ROM often had no long-term impact.
- These techniques were not resolving Greg's personal neuromuscular issues from a previous injury.
- Inconsistency with the belief of tightness being a cause for pain—dealing with athletes (e.g. gymnasts, dancers) who had greater than normal ROM but still had pain and dysfunction.
 - Conclusion: Loss of joint motion was not the only issue.
- Using functional movement assessment and correction to improve poor functional thresholds did not work as well as identifying isolated issues.
 - Dealing with the isolated issue first, and then seeing carryover to functional movement improvement appeared to have more efficacy.
- Intertester reliability for detecting pelvic girdle alignment assessment and joint motion was poor. This intertester reliability was questioned when it came to correction outcome interpretation as well.

GREG'S CONCLUSIONS AND NEW DIRECTIONS

Through experimentation and research, Greg began to formulate a new series of conclusions based on the outcomes he was seeing personally and with his clients:

- Hypermobility could be a problem in the absence of muscle strength.
- When exercise (stretching: strengthening) didn't work to create lasting improvement (often exercise would worsen the condition), something was missing.
- When strengthening the whole system, in spite of compensations and local weaknesses, one could still reduce symptoms. The reduction of symptoms was the key success measure of interventional efficacy.
- Focus on the restricted side (tight side) when joint ROM was in question.
- Combine table-based isolated joint ROM assessments (Jackson) with functional assessments (Gray) to improve performance and ROM. Still do stretching/strengthening processes for observed limitations in motion and postural deviations.
- Generally, good results drove the continuance of his process: Find joint ROM limits and use stretching/strengthening to improve joint ROM and function.

Determined to find a process exercise professionals could use, Greg wanted to understand more about the muscle systems' role in injury and what fitness trainers could do to support the process of recovery. Greg's process for resolving muscular imbalances was based upon an attempt to stretch the tight muscles and strengthen the opposing weak muscles (Janda). The emphasis of his intervention techniques involved stretching and performing various manual techniques designed to loosen up the tight tissues. The primary goal was to increase ROM. Greg would follow this with "corrective" exercises designed to strengthen the opposite muscles in order to ensure that the client was strong throughout their newly found ROM. This mode of correcting muscular imbalances did come with a certain degree of success, however, due to repeated failures, Greg was still looking for other answers.

It was during this time that Greg wondered "Why do muscles tighten up?".

FILLING THE VOID

Greg observed a correlation with joint ROM limitation found in an isolated assessment and injury/dysfunction, but also noticed the loss of joint ROM shows up through the "functional" assessment procedures. In tracking this, Greg had a grid/matrix that he would use to measure motion distances. While doing this, he noticed a correlation between how far an individual moved and the loss of their physical capabilities. When people reported pain or demonstrated disability, they could not move as freely.

Greg discovered that increasing local joint ROM limitations via stretching or relaxation techniques did not seem to carry over to the clients' "functional tests". Following the prescription of strengthening exercises, Greg observed minor changes. Later he determined that the client was only getting stronger in their dysfunctional compensation patterns.

A GLIN ROSKOPF DEVELOPED MAT® KEY TURNING POINTS IN THE DEVELOPMENT PROCESS CHAPTER 2

Throughout this period, Greg was struggling to overcome his own stubborn lumbar injury. He was using the traditional corrective modalities and techniques, yet suffered persistent pain and had limitations in his physical capabilities. In fact, his condition seemed to be insidiously getting worse.

While Greg was attending a workshop led by Richard Jackson, Jackson mobilized a joint in Greg's big toe. To Greg's amazement, his low back pain went away for a day. This introduced Greg to the interrelated nature of the body and its impact on symptoms. The local-to-regional-to-system-wide relationship and how dysfunction and resulting pain could be caused by this interrelated design and function was a significant revelation. It contradicted the axiom "local symptom=local problem=local treatment".

Greg began to seek out integrated biomechanical-oriented specialists, and found very few. The prevailing medical therapeutic approach to injury was biased to the isolated approach using passive joint mobilizations/manipulations. The axiom, local symptom=local problem=local treatment, proved a powerful bias.

Gary Gray was one of the few practitioners Greg had encountered that professed the integrated biomechanical thought process explaining the system-wide mechanical influence that a single local mechanical problem could create. Greg slowly started moving more towards the Gray paradigm in his approach, although still drawn to the local symptom=local problem=local treatment idea.

A unique opportunity was presented to Greg while attending a wedding event. He met a professional basketball player, John Stockton, who was playing for the NBA's Utah Jazz at the time. Following a brief discussion with John, it became evident that John had an ongoing nagging injury. The player expressed interest in having Greg assess him right there at the wedding. Greg did so and John was impressed. That interaction led to Greg being hired by the Utah Jazz. This led to Greg's interaction with the team's medical and training staff. Greg began working directly with the team's chiropractor, Dr. Craig Buhler, and the players on a regular basis.

One of the first things Greg noticed about the assessment process was that the chiropractor utilized manual muscle testing. Greg had been exposed to manual muscle break testing as an assessment tool throughout the progression of his educational and professional career. His first exposure to manual muscle testing was during his Master's Degree program at Fresno State. In his athletic training classes, he was introduced to the manual muscle break tests defined by Kendall and Kendall. Later, while working with physical therapists, it became evident to Greg that muscle testing was a big part of the process for assessing muscle strength. However, the focus of Greg's attention was primarily on joint ROM limitations, which he had concluded as being a muscle tightness issue. Therefore, up to this point, Greg had not found a place for manual muscle testing in his assessment procedures.

Working with Dr. Buhler exposed Greg to the manual muscle testing procedures that were defined by Dr. Alan Beardall, the developer of Clinical Kinesiology. Greg realized that these muscle tests were different and more comprehensive than the break tests in that they

identified many anatomically designated muscles into divisions. This muscle test was referred to as the "Neuro Proprioceptive Response" (NPR) test. Greg learned that these NPR tests were based on earlier muscle tests defined by George Goodheart, the developer of Applied Kinesiology.

During a session where Greg and Dr. Buhler were jointly working on a professional basketball player, Dr. Buhler performed a procedure that restored strength to a specific set of muscles as indicated by the NPR test. Greg then performed a passive stretch on those muscles in order to increase joint ROM. Following that, Dr. Buhler repeated the NPR test of the stretched muscle, and the muscle was now weak. Neither of them could explain the weakness.

If Greg could create a weakness through one of his standard interventions, then that was not good! This outcome appeared to contradict the premise that applying stretching and strengthening techniques would restore normal muscle balance. Greg recalled past experiences where athletes were injured (e.g. pulled hamstrings) soon after stretching sessions. He wondered: "Did stretching increase mobility without concomitant strength, therefore making the athlete vulnerable to injury?". If this was a possibility, then he must seek to solve this problem. The NPR testing seemed to provide a tool to check muscle strength following a stretching intervention. Greg now recognized the importance of the NPR test: to check work and identify muscle weakness. Muscle weakness leads to vulnerability for the athlete while undergoing rigorous physical demand.

Working regularly with the Utah Jazz and Dr. Buhler, Greg began to experiment with the NPR tests. Initially, Greg could not discern the basis for, nor the predictable application of, the NPR tests. He was still using the functional assessment model, but began to incorporate the NPR tests into his work. It did not take long for Greg to begin regularly using the NPR tests as a strategic part of his everyday assessment procedures.

Based on the Richard Jackson workshop experience and the new NPR muscle tests, Greg slowly moved away from the local pain=local problem=local treatment axiom, and toward checking muscles distant to the local pain area.

Greg's process now combined assessing joint ROM (recognizing the integrated nature of the body) with the stretch and strengthening techniques and the NPR test, assessing for weaknesses on both the tight and the suspected weak side. Through this process, he found with the NPR test that muscles assumed to be weak in the conventional Upper Cross/Lower Cross (Tightness: Weakness) hypothesis were not testing weak, and that certain muscles assumed to be strong, were testing weak. Greg concluded that the various protocol-based interventions to correct joint ROM limitations and postural asymmetries deemed due to muscle imbalances, appeared incorrect.

In the execution of his process, various muscles would test weak via the NPR test, but Greg still had no real understanding of why this was. Furthermore, he had no correction process to restore the strength of the weak muscles except through issuing concentric/eccentric-based resistance training.

Through continual implementation of this new process of doing a joint ROM exam (which is now based on the blended perspectives and technical skills learned through Jackson, Gray, and Buhler), stretching some tissue, prescribing a concentric/eccentric-based strengthening exercise, and testing muscles with the NPR test, Greg began to see some interesting correlations regardless of where people were reporting pain. He found that whenever there was a limitation in ROM, there was correlating weakness associated with that limitation in ROM. The muscles that actually contracted to move the joint further into the position of limitation would test weak.

Greg also noted that the standard muscle tests, set up by Beardall, for certain muscles did not always place that muscle into a position of the range it could actually shorten into. Greg observed that in many of the Beardall NPR tests, the muscle could test strong as it was being tested in a range where it was capable of contracting effectively. Greg found that in many of those situations, if the muscle was then taken into a more shortened position, it would test weak. Greg wondered, "Why the discrepancy?".

When Greg would perform stretches to increase joint ROM, the standard test would be applied but not in the new range acquired post stretch. His intention to conduct the test in the newly-found joint ROM, and at the end of that ROM, was a clear departure from the Beardall-developed NPR test positions.

Greg began playing with the positions of the tests and began looking for positional weaknesses because many of Beardall's tests were not testing at end range. At this point, there were no defined tests, that Greg was aware of, that correlated with the end positions of a limitation in ROM. Beardall's NPR test represented the best tests to expand upon.

This led Greg to believe that there were voids in many of the tests defined by Goodheart and Beardall for identifying muscle weakness since many of their tests were not executed at extreme ranges of a joint's ROM capability. Some of the standard tests did take muscles to extreme positions and others did not. Greg began to compare and contrast the standard NPR test position result with the new NPR test position result. Greg found that the standard test might miss a weakness of a muscle since most of the standard tests were not set up in extreme positions of the joint ROM. He found that when he altered the position of those tests to a more extreme position in the range of motion, that same muscle or group of muscles would then test weak.

Greg's observations led to redefining the positions of many of the tests. He would test the muscles in a more extreme position, if not at the very end of their ROM capability. He found that this provided him with completely different information relative to the strength of the associated muscles, and this directly affected his decisions on what to stretch and what to strengthen. Greg would prescribe concentric/eccentric-based exercise to strengthen what tested weak and then would retest days later to see if the weakness resolved.

Greg started to create a vast array of joint ROM assessments that were specific to the positions of the NPR tests, which were muscle-specific in origin. This increased the number of assessments, and the nature of those assessments. He began connecting specific muscles' weaknesses to specific losses in joint ROM. Exploring joint ROM from a variety of posture and limb orientations, these new assessments displayed limitations that were not found with other, more general, limb orientation joint ROM assessments he had been performing. This showed Greg that specific muscle weaknesses could cause specific limitations in joint ROM.

Of note, when Greg began to test and locate weakness and then get muscles strong again, he would see changes occur in their "functional" capabilities as measured by the Gray matrix/grid system. He found that not only were his clients able to move more freely, but there was also less compensation. It appeared that by improving isolated muscle strength associated with a joint ROM limitation, the compensations he observed prior disappeared. This resulted in the much sought-after outcome for any intervention targeted at improving physical performance by creating stability to improve mobility.

As a conclusion of his observations regarding the restoration of muscle strength leading to increases in joint ROM, Greg developed his "walking on ice" analogy: When an individual walks on the unstable surface of ice, in order to protect themselves from the increased risk of losing control and falling, the body reduces its motion, lowers its center of gravity, and appears to tighten up. When the body loses strength (becomes unstable), then joint ROM decreases to prevent injury. The goal of his intervention was to "melt the ice". By providing the body with a sense of stability by increasing muscle strength, the body will give an increase in joint ROM: mobility. Greg also recognized a significant correlation relating to aging: The body tightens up as a result of the progressive loss of muscle strength (instability). This natural protective state is demonstrated by limitations in joint ROM.

Greg had developed a systematic process for checking a muscle-based joint ROM assessment that correlated muscle weakness with limits in ROM, but he did have one problem: as he was still working within the "stretch and

strengthen" paradigm, he did not have a stretch for these new, more complicated and isolated limitations in ROM. He had to rely more on strengthening to make corrections in muscle imbalances.

At this point, Greg had connected with Bill Phillips at EAS® (a nutritional supplement company). Since both EAS® and Greg had working relationships with some of the notable Denver Broncos players during the Broncos' Super Bowl years, EAS® hired Greg and helped sponsor his work in order for him to further develop the process into the systematic format now known as Muscle Activation Techniques® (MAT®). EAS® provided key resources while also dedicating one of their staff trainers to work with Greg as he experimented with various aspects of the process, including how to get weak muscles "activated". Greg observed that some muscles that tested weak did not respond to traditional exercise or to manual techniques. Greg wondered if there was a quicker way to get the muscles that test weak to test strong.

In response to the realization that specific muscles contributed to specific limitations in joint ROM, Greg began researching and building a reference document that listed and pictured every muscle he could think of in order to start building the muscle anatomy and test correlations with illustrations.

One day, while working with the EAS® trainer, Greg found a weakness in the trainer's posterior deltoid. As Greg looked at the anatomical picture of the posterior deltoid, he wondered if stimulating the attachments would affect the muscle. After stimulating the attachments, he retested the muscle and it immediately tested strong. Greg tried this with a few other muscles and realized that if the origin and insertions of a muscle were effectively stimulated through manual palpation, the associated muscles would immediately come back strong. It was at this point that Greg realized he needed to go back and relearn the anatomy of the muscular system. If he understood where each muscle attached anatomically, he could utilize this origin/insertion technique to activate each muscle when they tested weak. Greg later learned that in the early evolution of Goodheart's work in Applied Kinesiology, he implemented an origin/insertion technique that he eventually gave up on due to lack of success. It was Greg's philosophy that if the origin/insertion technique was implemented into a more biomechanically-based thought process, the results would be more effective. This was where the muscle tightness/muscle weakness philosophy fit in. By looking at limitations in ROM as the key determinant of where there are weaknesses in the body, it allows the practitioner to identify which muscles need to be treated.

Greg realized that muscle tightness could be due to muscle weakness since a limit in joint ROM was resolved when the agonist muscle strength was restored. Greg started having the EAS® trainer use the specific ROM

assessments combined with the NPR tests in order to determine where Greg's primary issues were relative to muscular weakness. When limitations in ROM were identified, Greg would have the trainer test the muscles that would need to contract effectively in order to achieve the limited motion. With the limited motion, there always seemed to be associated muscle weakness. He would have the trainer treat the weak muscles by manually stimulating their origins and insertions. After several sessions of this process, Greg's personal condition of back pain and persistent joint ROM limits started to resolve themselves. No other technique resolved his issue to the extent that this process did. For the first time in 15 years, without stretching, Greg was able to bend down and touch his toes. This limitation in motion had always correlated as one of the reasons for his ongoing back pain. By activating his hip flexors and abdominal muscles, Greg was able to move much more freely.

At this point, Greg felt confident enough to apply these principles to his clients' issues. He noticed the attachment stimulation technique (which he called a palpation) not only created strength relating to the NPR test, but also resulted in increased ROM. These principles were now being implemented on a daily basis with Greg's regular clients and the athletes he was working with through the Denver Broncos and Utah Jazz. The greatest thing about the principles was that he was able to implement them into a 5-step systematic process:

- STEP 1: Check ROM through a muscle-specific ROM exam.
- STEP 2: Perform an isolated muscle test on the muscles associated with limited ROM.
- STEP 3: Activate the weak muscles through manual stimulation of their origin and insertions.
- STEP 4: Recheck muscle strength through an isolated muscle test.
- STEP 5: Recheck muscle-specific ROM.

The key factor Greg noted was: regardless of the position of the tests defined by Goodheart and Beardall, if he was able to move the joint from the defined NPR test positions and find weaknesses, then those weaknesses indicated positions of instability or vulnerability. As noted previously, many of the NPR tests that he had learned from Beardall were not performed in the shortened position of a muscle. If a muscle cannot contract efficiently, it cannot shorten efficiently. Therefore, testing a muscle in a more shortened position would be most effective when attempting to identify muscle weakness.

Greg also learned from Mel Siff's book, <u>Supertraining</u>. It described the concept of performing an isometric contraction with its 15 degree carryover of strength into the direction of limitation for a limited joint ROM.

After experimenting with the isometrics, he found that in order to activate muscles, the isometrics only had efficacy at low intensities and in the shorter side of a muscle's length (i.e. tension). With the 15 degree carryover concept, Greg realized that motion could be performed and positions set up every 30 degrees in a plane. He called this the "30-60-90 Principle". He started performing the NPR tests at various positions and found weaknesses even outside of shortened positions.

With the near-immediate response of a muscle testing strong (via the NPR test after the palpation and the resulting increase in ROM) Greg knew that he had a system that was reproducible—something he had not experienced with anything else in his career up to that point. He created a name for this systematic process: Muscle Activation Techniques®.

Now that Greg had placed his work into a systematic process, he began presenting these principles in weekend courses. He also created videotapes demonstrating the MAT® techniques for students to reference after taking his courses. Although informative, Greg quickly realized that the format was not conducive to the students' attempts to acquire the skills that are necessary to perform the MAT® principles. A more long-term, organized, educational approach was needed in order for the process to be most effective. He also realized the need for a program where he could introduce the principles, but not teach the complex nature of palpating muscles for activation. This became the MAT® Jumpstart program.

Greg started teaching these introductory courses around the U.S. and began building a notable reputation as a presenter. At the same time, his concepts were gaining traction and acceptance in the industry. So much so that people had an interest in learning the more advanced skills that make up MAT®. So, he created a series of 3-day weekends of lecture and practical formats, delivered over an 8 month period. Greg chose to split up the information anatomically by creating modules separated into Lower Extremity, Upper Extremity, Trunk and Spine, and Cervical/Hand and Foot. He called this series of courses the MAT® Internship (now known as the MAT® Specialist program).

Greg took 21 people through the first internship with the intention of only teaching one series. During this period, more people heard about the course and wanted to participate. He decided to start offering the internship to interested students. Today, Greg has continued to run MAT® Jumpstart programs and MAT® Internships across the U.S. and into the U.K., Canada, Spain, and Mexico. To date, there have been thousands of students participating in MAT® programs worldwide.

A GLIMPSE INTO HOW GREG ROSKOPF DEVELOPED MAT®

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