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**HCE’s Clinical Approach and Key Concepts**

***Related to a Healthy Musculoskeletal System***

1. The current approach to Musculoskeletal Health in the United States, which is focused on labeling each acute episode with a **disease**, **pathology** and/or a problem with a **specific or isolated structure / tissue**, is ineffective, inefficient and extremely costly, consequently leading to unnecessary suffering and disability.
2. While there are a few true diseases of the musculoskeletal system (IE: rheumatoid arthritis, muscular dystrophy, multiple sclerosis, etc.) and obvious cases of acute trauma (car accidents, falls from significant heights, contact sports, etc.), HCE advocates that the overwhelming majority of musculoskeletal conditions are caused from inappropriate movements or positions performed over extended periods of time, to the ultimate detriment of our tissues.
3. These inappropriate movements or positions lead to abnormal tissue tension, irritation, pain, tissue degeneration, and ultimately to tissue failure.
4. The rate of tissue decline and the ultimate point of tissue failure are directly related to the degree of inappropriate movement or positions that the person engages in. In other words, the further from a **normal, precise healthy movement or position**, the faster the rate of tissue decline. The rate of tissue decline can be accelerated further if the inappropriate movements or positions are combined with significant force and/or significant repetitions. Tissue decline can happen in a matter of seconds, minutes, hours, months, years or even decades.
5. In the presence of “clinical limits,” irritation or pain, the human body will alter its normal, precise movement pattern to allow the “macro” movement to take place & to reduce or eliminate the irritation or pain. This adaptation is based upon the principles of **bio-tensegrity** and the area of greatest restriction (**AGR**). Simply put, the body will adjust its internal tension or forces to protect its weakest link.
6. If this “altered” movement pattern persists for as little as a few weeks, this altered movement pattern can become permanently “imprinted” on the cortex of the CNS. This inappropriate “imprinted” pattern in the CNS can persist even after the original reason for the “clinical limit,” pain or irritation has subsided.
7. In time, as little as six weeks for muscle tissue, longer for tendon, capsule, ligament or bone tissue, **structural changes** to the tissue of the musculoskeletal system can occur, leading to increasing levels of inappropriate movements and accelerating the rate of decline.
8. HCE advocates that even the most severe problems of the musculoskeletal system can respond positively, rapidly and permanently to restoring **normal, precise healthy movements and positions**. By responding “positively, rapidly and permanently,” HCE means:
   1. Pain can be reduced and eliminated, in the first and each subsequent treatment session.
   2. Tissue tension & irritation can be reduced and eliminated, in the first and each subsequent treatment session.
   3. Abnormal movement patterns can be “erased” from the cortex of the CNS and “replaced” with appropriate movement patterns.
   4. Structural abnormalities can be reversed and more healthy tissue and/or cellular components, and clinical processes, of those tissues can be installed.
9. The true question is: what is the most effective and efficient way to assess and restore **normal, precise healthy movement patterns**? HCE’s Clinical Approach is an eclectic collection of philosophies and techniques with contributions from the around the world. In addition to utilizing critical knowledge from the fields of human anatomy, physiology, neurology and the cognitive sciences, HCE has incorporated quality information from the following key contributors to the field of physical therapy and manual medicine:
   1. Bjorn W. Svendsen, DHSc, PT, FFAAOMPT
   2. Edward G. Stiles, D.O., F.A.A.O.
   3. Stanley V. Paris, PT, PhD, FAPTA, FFAAOMPT
   4. Michael D. Rogers, PT, OCS, OMPT, FFAAOMPT
   5. Susan J. Isernhagen, PT
   6. Dianne Lee PT, COMPT
   7. Brian Edwards PT, GDMT
   8. Gavin E. Hamer PT, DPT, FAOMPT, Dip MT
   9. Mark Laslett PT, PhD, Dip MT, Dip MDT
   10. Geoffrey Maitland PT
   11. Carolyn Richardson PT, PhD
   12. And many others too numerous to document here!
10. **Normal, Precise Healthy Movement –** In a clinic or an “onsite” HCE program, the job of a physical therapist is to **rapidly** identify the patient’s “weak” link or “**driver**” (the true cause of the problem) and not be thrown off track by the patient’s presenting complaint or recent history (the **manifestation** of the problem). HCE advocates utilizing an osteopathic approach designed to systematically identify the AGR present at each visit. The second task of the physical therapist is to develop a treatment program that will fix the true cause (the driver), in the most **effective and efficient** manner, **while simultaneously** impacting the patient’s complaint. HCE advocates that finding and addressing the patient’s AGR, matching each treatment technique to the nature of the restrictive barrier noted, and sequencing each visit according to objective changes in the AGR and restrictive barriers is the most efficient and clinically effective way to do this. The physical therapist must be able to objectively document the patient’s progress and successful outcomes via one or more reproducible “**clinical indicators**.”

HCE defines an “**internal driver**” as the true cause of a patient’s problem that is within a patient’s body, as opposed to an outside force or stimulus. This could also be referred to as the patient’s AGR.

If there is a work or play activity that is contributing to the patient’s “driver(s),” then it must be addressed & eliminated for a long term successful outcome. HCE defines this type of “driver” as an **external** (from outside the body) driver.

What is necessary for an individual to have a **normal, precise, healthy movement pattern**?

* 1. Full, unencumbered, range of motion (ROM), including both active and passive ROM, as well as, normal joint and soft tissue, **play** in the direction of motion being observed.
  2. Near perfect symmetry related to the left and right halves of the body, as well as, appropriate agonist-antagonist balance, or any other “co-contracting” tissues. The more asymmetry noted in a patient, the greater the potential for tissue decline.
  3. Normal accessory motions including appropriate component movements (IE: tibial rotation and fibular pistoning with knee flexion / extension, along with appropriate ankle movements) and normal joint or soft tissue, play in all other directions.
  4. Normal muscle recruitment sequences to include prime movers, static and dynamic stabilizers, plus normal involvement of all appropriate accessory / ancillary muscles needed as the “work load” increases.
  5. Normal, efficient neurological firing patterns within the CNS. (Clinical evidence of a problem with this would be “awkward” movements or the degradation of precise movement in just a few repetitions, with a slight increase in “work load,” with a slight increase in the speed of movement and/or with a slight amount of “cognitive” distractions.
  6. Normal ability to maintain a precise movement pattern during repetitive attempts. (Checking for normal endurance factors.)
  7. No evidence of localized or regional increases (or decreases) in tissue tension or temperature in the tissue being worked. The faster or more severe the presentation of localized or regional increases (or decreases) in tissue tension or temperature would be evidence of the degree of inadequate physiological mechanisms.

**Special Note:** Beginning with “g” listed above and moving towards “a”, the more of these items that are impaired or lost, the more severe the patient’s condition or level of disability will be.

1. An Effective Assessment and Treatment Sequencing Approach
   1. **Safety First:** If the history & or clinical evaluation does not clearly present as a musculoskeletal condition or presents with any “red flags,” you must answer the following question before proceeding any further.
      1. What is the most appropriate course of action?
         1. Perform further testing or history taking and determine that it is safe to treat the patient without the need for referral.
         2. Begin PT treatment along with making a referral to the appropriate health care professional based upon the history and or clinical exam.
         3. DO NOT TREAT and refer immediately to the appropriate health care professional based upon the history and or clinical exam.

**Subjective Assessment:**

* 1. Clues from the history that could impact physical therapy intervention
     1. Having an UNCLEAR mechanism of injury should give rise to concern for NON-musculoskeletal conditions.
     2. The presence of prior episodes of similar complaints or the prior “resolution” of other musculoskeletal problems may indicate the need for a broader (more comprehensive or global assessment) and would also indicate the probability of inappropriate CNS patterning being present.
     3. The more prior episodes and/or the more historical (older) any one of the prior episodes of other musculoskeletal problems indicates the greater likelihood of inappropriate movement patterns being present, and/or structural “adaptations”.
     4. Pain or other symptoms that are present in positions of “tissue support” or come on immediately when the tissue is loaded even slightly, is cause for concern related to NON-musculoskeletal conditions or a very severe musculoskeletal condition. (IE: Severe pain when fully supported in a bed or recliner should lead you to question if the pain is coming from a musculoskeletal issue, since the musculoskeletal system is mostly at rest/unloaded. Severe pain with the slightest force on a joint or bone might be suggestive of a underlying fracture or severe joint integrity issue.)
     5. Pain or symptoms that are present and increase when maintaining a static position may imply a poor “structural support” system. (IE: biotensegrity system failure, ligamentous, disc &/or joint integrity issues)
     6. A pattern of morning “tightness” that reduces shortly after moving about and increases as the day progresses could imply a hypermobility and / or an ATP production or transportation issue.
     7. Pain or symptoms that are present or increase with movements or function could indicate involvement of the contractile structures.
     8. … and m any more…

**Objective Assessment\*:**

* 1. Based upon the current state of the patient’s condition, the objective assessment should start with high-end functional activities, also called “global” activities. Examples of this type of activity might include: normal ambulation, squatting (double and single leg), stationary and dynamic lunges, “planking” in various directions and positions of increasing loads, single and double arm reaching (active to loaded), a good morning screen, etc. To the extent that an objective measurement can be recorded, any of these items could serve as a “clinical indicator.” (The significantly impaired patient will be asked to perform lower level functional or simple activities in line with their level of impairment. Clinical indicators can still be recorded.)
  2. Based upon the high-end functional activities applied above or prior to them, the concept of AGR Screening (Area of Greatest Restriction Screening) should be applied as indicated.
  3. Based upon the observations noted in the high-end functional screens and the AGR screen (and for reimbursement reasons), you might decide to precede to more classical or specific assessment techniques to document any notable limitations. Examples of this might include range of motion, manual muscle testing, reflexes, and or classic orthopedic “special tests.” Any of these items might serve as a “clinical indicator.”
  4. Documentation related to the reproduction of the patient’s complaint based upon the concept of “None/Some/It.” (IE: **None** = does not reproduce patient complaint at all; **Some** = Reproduces patient complaint, but not quite the right spot or feeling; **IT** = “Oh yeah, that is exactly what it feels like.” The concurrent pain or symptom.)

\*Special Note: HCE blends AGR screening and functional movement screenings to determine where to begin a treatment session and to document clinical indicators. Once treatment begins, HCE advocates “treating the patient out” according to the AGR Sequencing process. More will be discussed on treatment sequencing later in this document. The more chronic the nature of the patient’s MS system, the more the AGR Screening and treatment sequencing becomes imperative.

**Questions / concepts that should guide treatment sequencing.**

* 1. Which system (anatomical structures, physiological processes, neurological controls, behavioral patterns, etc.) of the human body will change or respond the quickest to a physical therapy intervention? **HCE’s response:** neurological control processes – by impacting joint and soft tissue mechanoreceptors in such a way as to promote normal proprioceptive input to the CNS & restore normal “biotensegrity forces. The CNS is now more likely to respond correctly (appropriate “sensory” levels and precise movement patterns) to both internal and external forces placed upon the body. Keep in mind it is these same neurological control processes that are negatively impacted by “lack of” normal movement or even the slightest of “tissue pressure,” via abnormal “biotensegrity” forces. The **take home message**: the neurological control processes and “biotensegrity” forces must be restored early, and often, in a patient’s treatment in order to gain, and maintain, immediate and prolonged positive outcomes, respectively.
  2. Considering “g” above, what would be the most effective and efficient method of restoring neurological control processes? **HCE Response:** This is where the concept of AGR (Area of Greatest Restriction) comes into play. If an area (joint, soft tissue or the combination thereof) is “restricted,” then the normal movement that would produce millions of “data packets” from all the mechanoreceptors does not exist, and therefore, the “data packets” related to precise body part position, relative tissue tension, etc. do NOT get sent to the CNS. The greater the restriction, the fewer “data packets” are available. Without this information, the CNS is left to “guess” as to exact body part position and tissue tension, and thereby sends efferent signals that may be less than correct. We MUST also account for the “restrictions” in and around mechanoreceptor and other neurological system “processing centers” such as pre & post synaptic ganglion of sensory, motor and autonomic nervous systems. Remember, it is the autonomic nervous system that is responsible for setting muscle tone that impacts both the skeletal muscles and smooth muscles (impacting blood flow). If “data packets” cannot get into or out of these ganglion then the impact can be far reaching, and not just in the immediate area of the physical restriction. Many of the important ganglia are concentrated in the thoracic spine and the upper cervical spine. The **take home message:** restricted movement in the thoracic spine and upper cervical spine can have devastating impact on normal, precise movement patterns throughout the entire body.

Restricted movements in other areas can also have a negative impact on the delivery and processing of “data packets” from both primary and secondary movements in the kinetic chain. Keep in mind, HCE considers the entire body “one big kinetic chain” and is not just limited to two or three joints that are located next to each other. This concept of finding and treating AGR is often referred to by HCE as treating “globally” before treating “locally,” or treating a “specific tissue.”

**Special, Special Note:** **the concept of biotensegrity (AGR basis) accounts for more than just movement precision. Normal Biotensegrity processes also accounts for proper spacing within and between various tissues, proper function of nerve tissue, blood vessels and the lymphatic system. As a matter of fact, normal biotensegrity mechanisms even account for proper cellular physiology. Destroy the biotensegrity system and you destroy normal “life” as we know it.**

**With this in mind, we do our patients a GREAT disservice if we do not fully restore each patient’s biotensegrity system as our primary objective of our treatment, instead of just addressing the patient’s current “manifestation” of symptoms!**

* 1. When should we take the time to assess and treat with very specific manual therapy techniques? **HCE Response:** When normal and precise movement and total elimination of a patient’s manifesting complaint are NOT achieved after treating “globally,” it may become necessary to look more locally (which still could be up and down the kinetic chain) for an abnormal movement in an accessory movement pattern (component motions &/or joint play.) The **take home message:** treating “globally” first will reduce or eliminate many, if not all, apparent restrictions of component motion and joint play, as well as, decreasing a patient’s level of reactivity (sensitivity). What is left after treating “globally” will be a much more clearly defined issue and the patient will be much more likely to tolerate direct, mechanically focused, manual therapy intervention.
  2. When in a treatment session or visit should the following activities be performed and why? Exercise or functional training activities, hands on clinical techniques, assessment techniques and documentation of clinical indicators, passive modalities. **HCE’s response:** First, hands on clinical techniques to assess and restore normal joint and soft tissue movements (first, via neurological control process restoration and only then a focus on structural deformation / remodeling); second, exercise and functional activities designed initially to maintain and support any “gains” achieved via the hands on techniques, and then focused on tissue remodeling as described later in this document; finally, if passive modalities would be of benefit (IE: heat to shunt increased oxygen to cells), they would be done at the end of the treatment session. **Quick assessment techniques and documentation of clinical indicators should be performed at the initiation of and throughout each treatment session (IE: immediately before and after a specific intervention to determine its value).** The **take home message**: if properly applied, these four components of care will enhance what has come before and expedite positive and lasting outcomes. Done in a different order, say initial eval, EX – modalities – hands on treatment sessions and a final discharge eval, we most probably will “support/promote” inappropriate movement patterns, and not support what we have done with our hands. Thus, limiting the speed of recovery or possibly creating long term patient failure.
  3. How do you select a patient’s exercises and how do you prescribe the correct exercise parameters? **HCE’s Response:**  A proper response to this question must first address the following issues,
     1. Given the limited amount of visits and limited time each visit, we should strive to perform the most effective and efficient exercise or activity to accomplish our specific goal for the patient.
     2. 10 -15 different exercises done for 3 sets of ten reps is **RARELY** the correct prescription to efficiently and effectively correct the patient’s problem.
     3. First, answer this question: should we be doing a global / functional activity or an isolated movement? **HCE Response:** The goal is to get them back to high level function, so this should be our preferred approach ***UNLESS*** there is a specific “weak link” of a specific structure or tissue (IE: true tendon weakness / irritation of a specific rotator cuff muscle or a unilateral, single level multifidus muscle) that would limit a normal and precise functional activity or motion. Ignoring this underlying issue could result in continued destruction of this tissue. In this case, a specific / isolated exercise may need to be performed until this “weak link” can be brought up to the level of the rest of the functional group.
     4. Second, what is the specific functional task or job of the “weak link” you are addressing? **HCE Response:** Is this tissue designed to provide structural stability, proprioceptive input, initiate strong actions, or provide precise neurological control? Or is the “weak link” a physiological mechanism? Depending upon the answer to these questions, you should alter the precise nature of the exercise or activity you prescribe. As an example, if someone has tenderness / heat and some notable swelling at a typical muscle’s tendon interface (IE: muscles tendon junction about the lateral epicondyle), you may get more benefit from a light weight object, say PVC pipe, bouncing up and down than from traditional “wrist extension” muscle work. The light resistive, bouncing activity would provide a quick stretch to the tendon, thus stimulating a muscular response against the light resistance level. What would “remodel” in this case is the muscle-tendon interface and NOT the muscle belly of the wrist extensors. If the “weak link” is the local physiological system of the tissue, your objective would be to repeatedly “deplete” the local energy and raw material supplies, and allow sufficient rest time for replenishing. Doing this repeatedly leads to “super compensation” and permanent cellular/tissue remodeling.
     5. Third, where do you start and how do you progress a patient’s exercise program? **HCE Response:** Exercise prescription and progression is a “moving target.” You should always be focused on “depleting” your target tissue (or functional movement pattern) in the specific type of activity the target tissue was designed for, and then allow sufficient rest and rebuilding time. If this is repeated enough and balanced with the proper rest & rebuilding time, the body will respond extremely rapidly **(even within a single visit)** and be ready for the next step. Go back to the HCE definition of “normal and precise movement” (10a-g above). Consider each item in the list and set your exercise level at their first sign of trouble (or better yet, at their highest level of success) within this list. You have control over exercise load (weight/resistance level) and can use less than full body weight (assistive exercises), body weight as the resistance or even add extra resistance to body or limb weight. You control range of motion, speed of activity, number of repetitions, rest cycles, ground stability levels, amount of direction changes, and much more. Find out where the person’s movements or

function becomes limited and start there. In other words, training / exercises must be set at the patient’s highest level of success; challenging them at this level. Determine their **“MAXIMUM TOLERABLE LOAD”** in each of these variables and push their limits. It is only through knowing and pushing these limits that we will most effectively and efficiently progress a patient’s recovery.

* + 1. When is a patient ready for discharge? **HCE Response:** When considering a typical patients life; no matter if they are an office worker, a laborer or a professional athlete, they all have “typical” levels of functional requirements with episodes of significant increases in those functional requirements (IE: the fireman that sits around the fire house, until the firm alarm is pulled). With this in mind, HCE recommends following the “discharge process” described below:
       1. Begin to eliminate all passive modalities and artificial support to determine if their body can “survive” without the heat, e-stim or ultrasound. If they truly have a negative reaction to the elimination of these items, we may NOT be truly treating the actual “driver” of their problem and have just been covering up their symptoms with these passive modalities. Step back and re-evaluate the situation. If you are successful in eliminating any passive modalities, move on to discharge step number two. Moist heat is typically the last “passive modality” eliminated by HCE. Discuss the reason for this! (**Hint:** Krebs Cycle, Oxygen-Hemoglobin Disassociation Curve)
       2. Begin to eliminate all the hands on manual techniques. It is still advisable to perform very quick assessments and document clinical indicators before and after treatment sessions just to determine if things are continuing to go right, but they should NOT need manual “intervention” at this point. If we find their tissues in need of manual intervention AGAIN, we may NOT be truly treating the actual “driver” of their problem, or not properly DOSING their exercises. At this point, we must re-evaluate what we are doing in the clinic AND discuss the possibility of “external drivers” that we need to address with the patient. Can we lessen or eliminate these external drivers or will we need to make the patient MUCH “stronger” in order to handle these external forces? If you are successful in eliminating all the manual interventions, then the patient is ready for the final discharge step. It is time to push them! *Fighting the FIRE!*
       3. Before a patient is discharged, **HCE recommends** that you have one or two treatment sessions where you dramatically increase the work load of their exercises or functional activities while they are in the clinic. It is your professional responsibility to use your clinical judgment, incorporating the patient’s current status. As stated above, everyone has these tough days or irregular activities and you should make sure they can handle it. It is much safer for the patient to be dramatically challenged within your clinic, under your supervision, than to have this happen three months after you discharge them. NOT TAKING THIS STEP COULD BE A NEGATIVE REFLECTION ON YOUR TREATMENT. If the patient has a “reoccurrence” of their symptoms following this “increased” functional activity three months after discharge, both the patient and the MD may think your treatment DID NOT WORK! If you test them in the clinic and they DO NOT DO WELL, you have objective documentation of the need for a little more treatment to overcome this problem.