

Commentary

FUNHAB[®]: A Science-based, Multimodal Approach for Musculoskeletal Conditions

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Abstract

Functional rehabilitation has become an accepted treatment strategy in many clinical settings in part due to the groundbreaking work of Dr. Vladimir Janda. His work has inspired the creation of a specifically designed treatment program, called FUNHAB[®]. FUNHAB[®] provides clinicians with a systematic progression of exercises and treatment strategies while still allowing exercises to be individualized to a patient's specific injury. This paper examines the concepts and basis behind the development of FUNHAB[®], what makes FUNHAB[®] unique to other therapy programs, and how to properly implement this therapy program.

Introduction

Sport & Spine Rehab (SSR) is a chiropractic and physical therapy based health care company with seven locations across the DC metro area, where the foundation of all therapy provided is a functional rehabilitation program called FUNHAB[®] (Sport & Spine Rehab Holdings Inc., Fort Washington). FUNHAB[®] is a pyramid treatment progression developed from the concepts and groundbreaking work of Dr. Vladimir Janda and his approach to rehabilitation. The term "sensorimotor system" is used to define this functional system of human movement, where in the muscle imbalance and chronic musculoskeletal pain are a result of neurological influences rather than structural changes.¹⁻² The Janda Approach focuses the assessment and treatment on the sensorimotor system, which includes the central nervous system and musculoskeletal system, rather than the musculoskeletal system alone.² Using the concepts of Janda's approach it can be concluded that an effective management strategy should incorporate a biomechanical approach where the entire kinetic chain is considered.³ The concepts and background of FUNHAB[®], what makes FUNHAB[®] different from other therapy programs, and an overview of how to implement this therapy program will be outlined below.

Discussion

Background

In the evaluation and treatment approach to musculoskeletal medicine there are two schools of thought, structural versus functional. The structural approach relies on visualizing static structures, focusing on the anatomical presence of structures, and forms the basis of most medical educations.² The functional approach to musculoskeletal injuries recognizes the true function of the muscle, including stabilization and the coordination of movement in relation to other structures.² This approach recognizes the function of all the processes and systems in the body rather than a single site like the structural approach.¹ Ultimately, the central nervous system (CNS) controls the activity of muscles in response to different stimuli and in turn controls the pattern of movement of the musculoskeletal system.⁴ The term “sensorimotor system” is used to define this functional system of human movement, where muscle imbalance and chronic musculoskeletal pain are a result of neurological influences rather than structural changes.¹⁻²

The Janda Approach has become the foundation of most functional rehabilitation programs. After contracting polio as a teenager and experiencing three years of intense rehabilitation, Dr. Vladimir Janda pursued his medical degree in neurology and rehabilitation.⁵ Janda published many papers on a wide variety of topics. These included: pediatrics, geriatrics, pediatric conditions effect on the adult, ankle conditions, postural and neurological disorders, rehabilitation, manual medicine standards, and neuro-diagnostic testing.⁵ Through his experiences and observation of patients Janda described the sensorimotor system as the basis of understanding rehabilitation.⁵ A key component of the sensorimotor system is that the central nervous system and motor system function as one unit.^{2,6} The connection between the CNS and sensorimotor system has been demonstrated in a number of studies including Bullock-Saxton et al., who reported balance shoe training subconsciously, not voluntarily, activates the gluteal musculature.⁷⁻⁹

Janda termed characteristic patterns of hypo- and hyper-activity which develop around the pelvis and shoulder girdle as muscle imbalances and were later known as “Janda’s Postural Syndromes”.⁵ These postural syndromes allow clinicians to focus on the cause of the pain by predicting patterns of tightness and weakness.² Janda’s classification of muscle imbalance patterns are the Upper-Crossed Syndrome, Lower-Crossed Syndrome, and Layer Syndrome.^{2,5} These crossed syndromes are characterized by alternating sides of inhibition and facilitation in the different quarters.² Specifically, upper-crossed syndrome is characterized by tightness in the upper trapezius, levator scapulae, and pectoralis major and the inhibition of the deep neck flexors and lower scapula stabilizers. The lower-crossed syndrome is characterized by tight hip flexors and spinal erectors and inhibition or weakness of the abdominal and gluteal muscles. Finally, layer syndrome is a combination of the two previously mentioned syndromes.⁴ Functional subacromial dysfunction is a classic example of an upper-crossed syndrome where decreased strength or flexibility in an agonistic muscle is compensated for by the antagonist muscle, leading to a dysfunction.¹⁰ The development of functional subacromial dysfunction arises from weak lower and middle trapezius, serratus anterior, infraspinatus, and deltoid muscles in conjunction with tight upper trapezius, pectorals, and levator scapula muscles.¹⁰

Janda demonstrated that in order to treat a dysfunction you must evaluate the body as a whole system due to the global influence of the sensorimotor system.¹ Evaluation of movement patterns should begin with a postural assessment, observation of gait and balance, and finally muscle tightness and movement

patterns.² Janda's treatment of muscular imbalances and chronic pain consists of four steps. First, the peripheral structures should be normalized using treatment approaches focused on restoring postural alignment, enforcing correct biomechanics, joint mobilization, and soft tissue mobilization.^{1,11} Next, restoration of muscle imbalances should be directed at correcting the common syndromes that may have developed gradually over time.¹⁻² Third, the treatment approach should facilitate sensory motor training integrating whole body movement with automatic stabilization.¹ These exercises should also progress from static to dynamic to functional activities.^{2,11} Finally, since fatigue is a predisposing factor to compensated movement patterns, there should be a focus on increasing endurance of coordinated movement patterns.¹ These concepts have become the foundation of the FUNHAB[®] phases.

The works of Janda and others has been developed and incorporated into the mainstream approach to muscular re-education of chiropractors and physical therapists alike.¹² Previous perceptions include that the chiropractic profession manages spinal conditions while physical therapists are viewed as experts in peripheral problems; however, peripheral conditions are the third most reported complaint to chiropractors.³ Regardless of the practice setting, an effective management strategy should incorporate a neuro-biomechanical approach where the entire kinetic chain is considered.³ In a literature review by McHardy and colleagues, it was found that a typical chiropractic management strategy for peripheral joint conditions involves a multimodal approach which integrates passive and active care.³ A multimodal approach extends beyond manipulative treatment by incorporating flexibility, strengthening, endurance, proprioception or balance, and aerobic fitness.¹² This approach has been shown to be effective at improving short and long term pain, disability and patient-perceived recovery in numerous conditions, including low back and neck pain.¹³⁻¹⁶ Specifically, researchers have found the use of strengthening exercises in combination with manipulation to be more beneficial in reducing neck pain compared to manipulation alone.^{13-14,17} Providing an evidence-based intervention program focused on manipulation and therapeutic exercise progressions allows FUNHAB[®] to produce greater clinical improvement and patient satisfaction than standard therapy alone.

What Is FUNHAB[®]?

The FUNHAB[®] protocol is a science-based functional rehabilitation program modeled after the Janda Approach to rehabilitation for patients in any outpatient rehabilitation setting, like chiropractic and physical therapy clinics and athletic training rooms. While on the surface, FUNHAB[®] appears to be solely about exercise, it actually is a multimodal treatment program inclusive of manual therapy and modalities. It is a protocol aimed at maximizing appropriate clinical tools complete with spinal manipulation, soft tissue modalities, and rehabilitative functional exercises. FUNHAB[®] is comprised of an exercise treatment and progression that addresses local, regional, and global neuro-musculoskeletal dysfunctions by integrating both the biomechanical and neurological components of rehabilitation. In addition to manual therapy and physiotherapies, the protocol takes the patient through postural, local, regional and then full body exercise progressions in an attempt to maximize their overall level of function and correct muscular imbalances and dysfunctions. FUNHAB[®] ensures optimal biomechanical and neurophysiological function with its comprehensive physical rehabilitation approach and is designed to adapt itself to each individual's specific nerve, muscle, and joint dysfunctions.

A critical question is what makes FUNHAB[®] different from other rehabilitation programs? The FUNHAB[®] protocol prescription and implementation is an 11-level, region specific treatment progression based on the patient's pain, biomechanical dysfunction, or functional limitation which need to be corrected.

There are four different pyramids based upon specific regions of the body. These include the Cervico-Thoracic Treatment Pyramid, Upper Quarter Treatment Pyramid, Lumbo-Pelvic Treatment Pyramid, and Lower Quarter Treatment Pyramid.

The Cervico-Thoracic Treatment Pyramid is designed for conditions of the cervical and upper thoracic spine like whiplash, stiff neck, cervical dysfunction, and anterior head posture. The Upper Quarter Treatment Pyramid outlines exercise progressions for conditions that affect the upper extremities and shoulders, such as carpal tunnel, rotator cuff syndrome, frozen shoulder, and bicep tendonitis. The Lumbo-Pelvic Treatment Pyramid provides exercises for the lower thoracic and lumbar spine regions and SI joint to address conditions like sciatica, piriformis syndrome, spondylosis, and mechanical lower back pain. Finally, the Lower Quarter Treatment Pyramid is designed for conditions that affect the lower extremities including the hip joint. Examples include patellar tendonitis, ankle sprains, hamstring strains, and Achilles tendonitis. Each treatment pyramid can be found in **Figures 1-4**.

Figure 1. Cervico-thoracic FUNHAB® treatment pyramid



Figure 2. Upper quarter FUNHAB® treatment pyramid



Figure 3. Lumbo-pelvic FUNHAB® treatment pyramid



Figure 4. Lower quarter FUNHAB® treatment pyramid



The FUNHAB® pyramids provide the most effective functional rehabilitation exercises for various musculoskeletal conditions assembled and laid out in an easy to follow pyramid format, with foundational skills at the base and complex movements at the top. The pyramids allow a systematic progression of condition specific exercises while also looking at global movement patterns. By the time patients reach the apex of the pyramid, they have built strength, decreased pain, and returned to prior functional levels. Patients progress to advanced exercise levels once they are able to perform exercises at their current level with minimal symptoms and/or exacerbations. FUNHAB® is designed to optimize each patient’s chiropractic, physical therapy, and rehabilitation experience by ensuring the implementation of a functionally and consistently monitored rehab program for the duration of the treatment plan.

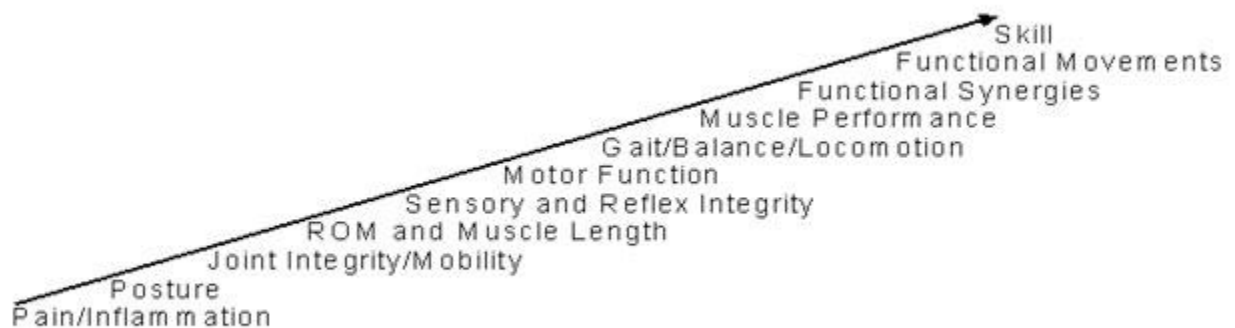
FUNHAB® Implementation

The first step to implementing FUNHAB® is a thorough initial examination, which will aid the clinician in choosing which region specific pyramid to select. Initial assessment should include postural assessment, neurologic assessment, balance and gait assessment, movement patterns, an orthopedic examination, and functional tests. The findings of the initial assessment will allow an injury specific intervention program to be created. A standard FUNHAB® rehabilitation program will start at the base of the pyramid, decreasing pain and inflammation, and progress through the stages. However, there may be instances where some patients will start higher in the pyramid based upon the findings of the initial examination. Exercises are added and progressed based on the patient's reported pain and symptom levels, strength, range of motion, and physical performance of the challenge. Phases may also be addressed simultaneously as long as the patient can tolerate the volume and intensity of the program; Kinesiotape may be added during any phase.

A standard program typically follows the acute and chronic care guidelines published by the Council on Chiropractic Guidelines and Practice Parameters and may be prescribed three times a week, for roughly an hour per session.¹⁸⁻¹⁹ This can be reduced to two times per week after four or more weeks depending on the patient's condition. Higher frequency of care is recommended based on the findings of Haas et. al, demonstrating reduced pain and disability with increased frequency of treatment.²⁰ Patients should progress through FUNHAB® and be discharged from care once they reach level 11, typically at a minimum of six weeks after the initial examination.

The phases of the pyramid include: pain/inflammation, posture, joint integrity/mobility, ROM and muscle length, sensory and reflex integrity, motor function, gait/balance/locomotion, muscle performance, functional synergies, functional movements, and skill (Figure 5).

Figure 5. Phases of FUNHAB® pyramids



The pyramids are designed to be an easy to follow, visualization of progression and are based on Maslow's Hierarchy of Needs principle, where, in general terms, each level is needed to be addressed before subsequent levels.²¹ The left side of the pyramid lists each phase, the right side lists the corresponding action or focus area of each phase, and the middle of the pyramid lists specific exercises corresponding to the phase. The patient is systematically progressed up the pyramid as his/her body is able to do more.

Although exercises are listed under each phase, the pyramids allow for individualized care and progression as many of the exercises can be adjusted to work in multiple phases depending on the level

of the patient and his or her condition. Additionally, there may be some exercises or injuries that can be categorized in multiple pyramids depending on the region of the body affected. For example, some scapular exercises or injuries may fall within the Cervico-Thoracic Treatment Pyramid as well as the Upper Quarter Treatment Pyramid. Similarly; the exercises designed to address the hip may be categorized in the Lower Quarter or the Lumbo-Pelvic Treatment Pyramid. The treatment pyramids provide the option for a clinician to apply the best exercise within the phase of the pyramid while complimenting other treatment strategies they are employing, regardless of the treatment pyramid utilized.

Example of Lower Body Therapy Program

A 16 year old female soccer player is evaluated for swelling and pain in her left ankle, and diagnosed with a Grade I left lateral ankle sprain. The clinician decides to place the patient on a therapy program in the Lower Quarter Treatment Pyramid, beginning at the base level to address the pain and inflammation. An exercises progression through the phases may look similar to **Table 1**.

Table 1. Example of lower body therapy program.

Pain & Inflammation	» Electrical Stimulation and Ice
Posture	» Gluteal Muscle Sets
Joint Integrity/Mobility	» Graston, Joint Mobilizations
ROM and Muscle Length	» Ankle ABC's, Ski Jumpers
Sensory & Reflex Integrity	» Wobble Board, Towel Crunches, Clock Steps, Kinesiotape
Motor Function	» 4-Way Ankle, Wall Squats, Clam Shells, Calf Raises, Monster Walks
Gait, Balance, & Locomotion	» One Legged Stance, Side-to-Side Sways
Muscle Performance	» Grapevine, Running Man, Bowler Squat
Functional Synergies	» One Legged Stance with Ball Toss, Any exercise with less stability or muscle tension
Functional Movements	» Ladder Drill, Squat Jump
Skill	» Dribbling Shooting, Cutting

Example of Upper Body Therapy Program

A 25 year old male baseball player reports pain and weakness in his right shoulder. Following the initial examination, he is diagnosed with right rotator cuff syndrome and scapular dyskinesis. In order to treat the two conditions, the clinician prescribes exercises and therapy options from both the Cervico-Thoracic Treatment Pyramid and the Upper Quarter Treatment Pyramid. Some exercises are specific to each pyramid, while others are found in both, since the regions overlap. A progression through the phases may look similar to **Table 2**.

Table 2. Example of upper body therapy program.

Pain & Inflammation	» Electrical Stimulation and ice
Posture	» Bruegger's, Wall Angel's, 3 Angle Rows
Joint Integrity/Mobility	» Thoracic Foam Roller, Codman's, Graston
ROM and Muscle Length	» T4 Foam Roller Mobilization, Cat-Camel, Golf Club stretches, Wall Walks
Sensory & Reflex Integrity	» Kinesiotape, Shoulder Ball-On-Wall
Motor Function	» W-V's, W-Exercise, Scaption, Lower Trapezius Vector, Sling
Gait, Balance, & Locomotion	» 3 Angle Rows on Stability Pad, Band Loop Walks
Muscle Performance	» I-T-Y's on Stability Ball, External & Internal Rotation with T-Band, Scapular Retraction, Prone Walk-outs on Hands
Functional Synergies	» Sword, Frisbee, Torsional Push-up, Bird Dog, Stirring the Pot, Kettle Bell Shoulder Bottom-Up
Functional Movements	» Sword with Squat, 3 Angle Rows on Rocker Board, 3 Angle Pick-ups without Upper Trapezius Activity, The Pit
Skill	» X-Walk, Turkish Get-up, Rolling with Upper Extremity Activation

Conclusion

FUNHAB® is a specifically designed treatment program to provide clinicians with a systematic progression of exercises and treatment strategies while still allowing exercises and therapy to be individualized to a patient's specific injury. Through the work of Janda and his colleagues, a functional approach to rehabilitation has become an accepted treatment strategy and the basis of this rehabilitation program. FUNHAB® is a multimodal treatment program aimed at maximizing appropriate clinical tools complete with spinal manipulation, soft tissue modalities, and rehabilitative functional exercises. The four pyramids are focused on specific regions of the body and include the Cervico-Thoracic Treatment Pyramid, Upper Quarter Treatment Pyramid, Lumbo-Pelvic Treatment Pyramid, and Lower Quarter Treatment Pyramid. Not all injuries will fall perfectly in one specific treatment pyramid, but can be addressed by using the most appropriate treatments and exercises from multiple pyramids. Each phase of FUNHAB® is addressed prior to moving on to the subsequent phase and allows for an effective management strategy incorporating a biomechanical approach where the entire kinetic chain is considered. This program should be utilized in a variety of clinical settings including chiropractic, physical therapy, and athletic training rooms as an effective treatment strategy for any injury.

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Potential Conflict of Interest

FUNHAB® is one of several tools used for the treatment of musculoskeletal conditions. Although no direct profit is received from FUNHAB®, Sport and Spine Rehab locations gain profits from the total care provided to patients. Dr. Greenstein and Dr. Bishop both own stock in Sport and Spine Rehab Holdings Inc., which owns the trademark to FUNHAB®, and were employed by American Operations, the management company of the Sport and Spine Rehab locations, during the design and implementation phases of this program.

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