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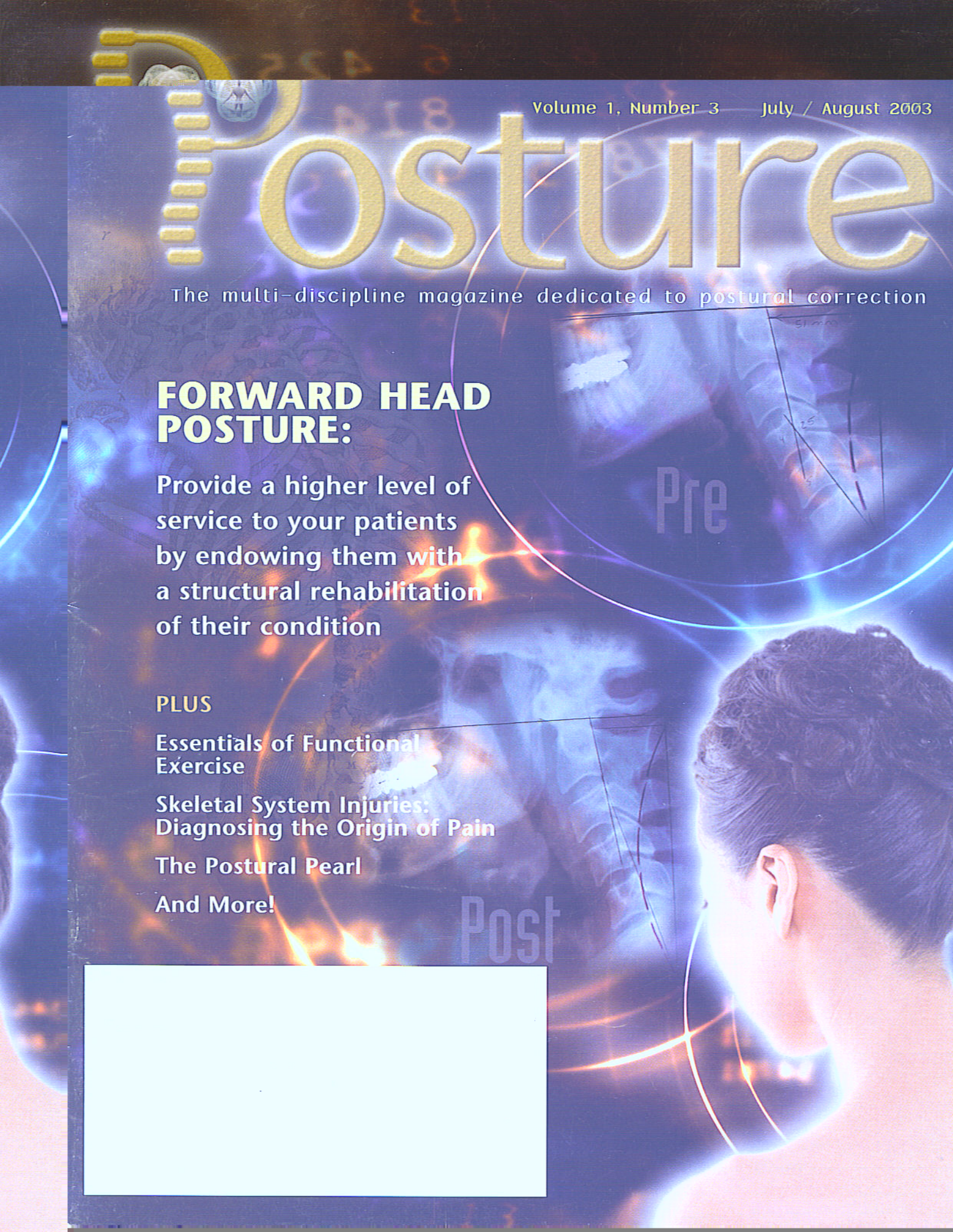

Part 1 of a 2-Part Series

Essentials of Functional Exercise:

A Four-Step Clinical Model for Therapeutic Exercise Prescription

By Gray Cook, MSPT, OCS, CSCS and Michael L. Voight

Exercise used at the therapeutic level must refine movement, not simply create general exertion with the hope of increased movement tolerance

It is widely accepted that therapeutic exercise encompasses a majority of treatment techniques employed in physical medicine. Although many practitioners of physical medicine such as chiropractors, and occupational therapists prescribe or employ physical means to advance and accelerate the rehabilitation process of their patients, the field of physical therapy has always housed a specialized exercise-specific knowledge base.

Today's therapist has received instruction and information in general exercise science with emphasis in exercise physiology, kinesiology, and biomechanics. This general knowledge is enhanced by a unique clinical focus on pathologic orthopedic and neurologic states and their functional representation. This special focus charges the therapist to consider evaluation of human movement as a complex multi-system interaction and the logical starting point for exercise prescription.

Exercise prescription choices must continually represent the specialized training of the therapist through a consistent and centralized focus on human function. Exercise used at the therapeutic level must refine movement, not simply create general exertion with the hope of increased movement tolerance. Moore and Durstine state: "Unfortunately, exercise training to optimize functional capacity has not been well studied in the context of most chronic diseases or disabilities. As a result, many exercise professionals have used clinical experience to develop their own methods for prescribing exercise".

The following four principles for exercise prescription are based on human movement and the systems upon which it is constructed. The intention of these four distinct categories is to break down and reconstruct the factors that influence functional movement, and to stimulate

inductive reasoning, deductive reasoning, and the critical thinking needed to develop a therapeutic exercise progression. Hopefully, these factors will serve the intended purpose of organization and clarity, thereby giving due respect to the many insightful clinicians who have provided the foundation and substance for the construction of this practical framework.

The four principle considerations for therapeutic exercise prescription are the following:

1. Functional evaluation and assessment of condition of dysfunction (disability) and impairment.
2. Identification and management of motor control.
3. Identification and management of osteokinematic and arthrokinematic limitations.
4. Identification of current movement patterns followed by facilitation and integration of synergistic movement patterns.

Incorporation of Four Principles

- *Functional evaluation and assessment.* The evaluation must identify a functional problem or limitation resulting in a functional diagnosis. The observation of whole movement patterns, tempered with practical knowledge of key stress points and common compensatory patterns will improve evaluation efficiency.
- *Identification of motor control.* Orthopedic and sports physical therapy could be greatly advanced by understanding functional milestones and fundamental movements such as those demonstrated during the positions and postures paramount to growth and development. These milestones serve as key representations of functional mobility and control. They also play a role in the initial setup and design of the exercise program.
- *Identification of osteokinematic and arthrokinematic limitations.* The skills and techniques of orthopedic manual therapy are beneficial in identification of specific arthrokinematic restrictions that would limit movement or impede the motor learning process. Management of myofascial structures will improve osteokinematic movement as well as balance muscle tone between the agonist and antagonist. This will also help the therapist understand the dynamics of the impairment.
- *Integration of synergistic movement patterns.* Once those restrictions and limitations are managed and gross motion is restored, the application of PNF-type patterning will further improve neuromuscular function and control. Considering synergistic movement is the final step in the restoration of function by focusing on coordination, timing, and motor learning.

The application of all four principles in the appropriate sequence will allow the clinician to understand a starting point, consistent progression, and end point for each exercise prescription. This sequence is achieved by using functional activities and fundamental movement patterns as goals. By proceeding in this fashion, the physical therapist will have the ability to evaluate the whole above the parts and then discuss the parts as they apply. The true art of physical therapy is to understand the whole of synergistic functional movement and those therapeutic techniques that will have the greatest positive effect on that movement in the least amount of time. The system is designed to produce musculoskeletal and neuromuscular changes while creating a more favorable motor learning environment.

The Four P's

The four Ps are actually four simple words starting with the letter "P" that represents the four principles previously mentioned. They serve as quick reminders of the hierarchy, interaction, and application of each principle. The question of what, when, where, and how with respect to functional movement assessment and exercise prescription are answered in the appropriate order.

1. **Purpose.** Functional evaluation and assessment.
2. **Posture.** Identification of motor control.
3. **Position.** Identification of osteokinematic and arthrokinematic limitations.
4. **Pattern.** Integration of synergistic movement patterns.

Purpose

Primary questions

1. *What* functional activity is limited?
2. *What* does the limitation appear to be - a mobility problem or a stability problem?
3. *What* is the dysfunction or disability?
4. *What* fundamental movement is limited?
5. *What* is the impairment?

The word "purpose" is simply a cue to be used both during the evaluation process and the exercise prescription process to keep the clinician intently focused on the greatest single limiting factor of function. It is not uncommon for the therapist to attempt to resolve multiple problems with the initial exercise prescription. However, the practice of identifying the single greatest limiting factor will reduce frustration and also not overwhelm the patient. There may be other factors that have also been identified in the evaluation; however, a major limiting factor or single weak link should stand out

and be the focus of initial therapeutic intervention regarding exercise. Alterations in the limiting factor may produce positive changes elsewhere that can be identified and considered prior to the next exercise progression.

The functional evaluation process should take on three distinct layers or levels. Each of the three levels should involve qualitative observations followed by quantitative documentation when possible. The levels are functional activity assessment, functional or fundamental movement assessment, and specific clinical measurement. Normative data is helpful but bilateral comparison is also effective and serves to demonstrate the functional problem to the patient at each level. Until the physical therapy evaluation, many patients think the problem is simply symptomatic and structural in nature and have no example of dysfunction outside of pain with movement. Moffroid and Zimny suggest that, "Muscle strength of the right and left sides is more similar in the proximal muscles whereas we accept a 10% to 15% difference in strength of the distal muscles…With joint flexibility, we accept a 5% difference between goniometric measurements of the right and left sides."

Next issue: Functional Activity Assessment, Clinical Measurements to Identify Specific Problems and Posture

Gray Cook, MSPT, OCS, CSCS, a practicing physical therapist, has spent his entire career refining and developing functional evaluation exercise techniques. His work was developed into a journal article that was the foundation of a nationally recognized continuing education course for physical therapists and athletic trainers. Currently, Gray leads a team of professionals working both in sports and fitness at Reebok University (a research and education branch of the well known shoe and apparel company). He is a board-certified orthopedic clinical specialist with the American Physical Therapy Association. Gray is also a certified strength and conditioning specialist with the National Strength and Conditioning Association. He is a Level I coach with the U. S. Weight Lifting Federation. Gray has lectured nationally and internationally in the fields of physical therapy, sports medicine and performance enhancement. Gray currently practices physical therapy in Southwest Virginia and continues to publish and present topics related to rehabilitation and exercise.