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Kinesiology *for* Occupational Therapy

Second Edition

MELINDA F. RYBSKI

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KINESIOLOGY
for Occupational Therapy

SECOND EDITION

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PREFACE

This book is written for occupational therapists and occupational therapy students. The purpose of this book is to explore and explain how movement occurs from a musculoskeletal orientation. This text does not discuss the influence and contribution of the sensory system, nervous systems, volition, or cognition on the production of movement, although these are clearly vital parts of movement.

This text includes descriptions of how joints, muscles, and bones all interact to produce movement. General information about muscles and assessment of strength, as well as joints and assessment of joint motion, are contained in two chapters that will elucidate this idea of movement. There are six chapters devoted to how movement is produced at each joint (shoulder, elbow, wrist, hand, lower extremity, and posture). Being able to visualize the internal mechanisms of joint movement and to accurately assess observable joint characteristics is an important part of understanding movement.

In order to understand how movement is produced, kinesiology concepts are explained with regard to forces acting on the body and how these forces influence not only movement but ultimately our intervention with clients.

Because this book is written for occupational therapists, the first chapter briefly explains concepts particularly related to the profession of occupational therapy. Terminology is defined according to *Occupational Therapy Practice Framework: Domain and Process* as well as *International Classification of Functioning, Disability, and Health* (*ICF*) terminology.

Once one understands how movement is produced and how to assess strength and joint motion, the next logical step is to learn about appropriate intervention. The last two chapters are devoted to two intervention frames of reference used in occupational therapy. Included in each of these chapters are goals relative to areas of focus that include the theoretic principles that underlie intervention. It is important to be able to clearly articulate to our clients, their families, other professionals, and third-party payers what we are doing and why.

While this textbook focuses on a very small part of the occupational therapy domain (musculoskeletal client factors), it is imperative for the occupational therapist to remain true to occupational therapy values of client-centered, holistic, and systems-oriented practice. Include the client and family in the entire intervention process, which will ensure better treatment outcomes and improved client satisfaction.

Instructor's materials include class activities, discussion questions, and learning tasks.

Melinda F. Rybski, PhD, OTR/L

CONTENTS

SECTION I

Foundations and Assessment

1

Occupational Therapy Concepts

Occupational therapy is directed toward "supporting health and participation in life through engagement in occupation" (American Occupational Therapy Association [AOTA], 2008, p. 626). This statement reflects the philosophy and values of the profession, which include a holistic, client-centered, occupation-based, and systems-oriented approach focused on participation and health (Cole, 2010).

Conceptual Foundations

The *Occupational Therapy Practice Framework: Domain and Process* (OTPF) (AOTA, 2008) is an official document of the American Occupational Therapy Association providing constructs that define and guide the practice of occupational therapy. The OTPF is based on the core values and beliefs of the profession and uses much of the language of the *International Classification of Functioning, Disability, and Health* (ICF) from the World Health Organization (WHO).

Systems-Oriented

The ICF, developed by the WHO as a part of a "family" of classifications for application to various aspects of health, was written to "provide a unified and standard language and framework for the description of health and health-related states" (WHO, 2001, p. 3). This classification system and conceptual model can provide a uniform language to describe health and health-related conditions and a conceptual model to visualize the relationships of functioning and disability with contextual factors.

The OTPF also provides consistent language and concepts that can be used by internal and external audiences to clearly express the role of occupational therapy contribution to health promotion and participation in occupation (AOTA, 2008). The ICF and OTPF documents reflect a shift from a disease perspective to one related to health. Health and wellness involves individuals, organizations, and societies and is seen as an active process of making choices for an optimal state of physical, mental, and social well-being. The OTPF is aligned with global health trends emphasizing health and wellness as well as a growing awareness of the need to provide opportunities and resources for success in activity participation (occupational justice).

Taking a systems-oriented approach, larger contexts of intervention are recognized. With an expanded view of who the client can be, intervention is directed not only toward those clients who may already have activity limitations and participation restrictions, but also toward those who may be at risk for health conditions or toward the population as a whole.

A systems-approach recognizes the variety of contexts in which intervention occurs. The ICF considers the physical, social, and attitudinal environment in which people live and includes detailed descriptions of environmental factors that include products and technology; natural environment and human-made changes to the environment; support and relationships; attitudes; and services, systems, and policies. The OTPF defines contexts as cultural, personal, temporal, virtual, physical, and social.

Benefits of systems-oriented frameworks may "influence universal design, public education and legislation, permit

Rybski MF.
Kinesiology for Occupational Therapy, Second Edition (pp 3-12)

comparison across patients, studies, countries and clinical services, populations, predict health care system usage and costs and provide evidence for social policies and laws" (Jette, Norweg, & Haley, 2008, p. 964). Determining the health of populations and prevalence of health outcomes in terms of health-care needs and effectiveness of health-care systems can serve public health purposes. Further, the use of a standard language can help in policy development in the areas of social security, employment, transportation, and access to technology (Unstun, 2002). As Madden, Choi, and Sykes (2003) state, "the use of a common framework, with its common definitions and classifications, thus helps to produce meaningful information for decision making and policy development and increases the likelihood of improved outcomes for people with disabilities" (p. 676).

Systems-oriented approaches in occupational therapy (also called overarching frames of reference [Dunn, 2000], conceptual models [Reed & Sanderson, 1999], or occupation-based frameworks [Baum, Christensen, & Haugen, 2005]) include relationships between the person, environment, and occupational performance with the focus on occupation (Cole, 2010). The Canadian Model of Occupational Performance focuses on the relationships between Person-Environment-Occupation (PEO) and is an example of a conceptual umbrella on which intervention can be based. Other occupation-based models are Occupational Behavior (Reilly, 1969), Model of Human Occupation (Kielhofner & Burke, 1980), Occupational Adaptation (Schkade & Schultz, 1992a, 1992b), Ecology of Human Performance (Dunn, Brown, & McGuigan, 1994), and Person, Environment, Occupation, Performance (Christiansen, 1994).

Holistic and Client-Centered

The ICF framework is described as a biopsychosocial model that integrates aspects of the more traditional medical model with the social model advocated by the disability community (Crimmins & Seeman, 2004; WHO, 2001). The ICF model integrates the need to cure and prevent disease (medical model) with the goal of increasing participation in daily life (social model) (Iezzoni & Freedman, 2008). The ICF model describes "the situation of each person within an array of health or health related domains...made within the context of environmental and personal factors" (WHO, 2001, p. 8). The ICF framework describes functioning and disability as "a dynamic interaction between health conditions and contextual factors" (WHO, 2001, p. 8).

The OTPF also reflects a holistic understanding of the client. Just like the ICF and the biopsychosocial model, the practice of occupational therapy involves intervention that is remedial (medical model) and social (social model). Kielhofner and Burke (1977) identified paradigm shifts that have occurred in the history of occupational therapy. The first paradigm shift was from a focus on occupation to a mechanistic or reductionistic model. This occurred between 1940 and 1970 and was a result of greater alignment with the medical model. From this shift, three models emerged: kinesiology (including the biomechanical and rehabilitation approaches), psychoanalytic (psychodynamic), and sensory integrative (neuroscience, motor control). Since the 1980s, occupational therapy has moved toward a focus on occupation itself and broader models (such as ICF model and occupation-based models) and away from the primary emphasis on physical, sensory, psychological, emotional, or cognitive components of function.

The profession's early roots in humanism and pragmatism are evident in the OTPF with the "dedication to the betterment of the human condition and the right of each person to respect, dignity and a meaningful and productive role in society" (Cole, 2010, p. 78). Client-centered practice is driven by respect for the client and caregivers and for the choices they make for their lives. Intervention is individualized based on active participation of the client in determining goals with clients assuming ultimate responsibility for decisions about occupations they wish to resume. The therapist collaborates with the client to solve occupational performance issues.

In providing services that are client-centered, occupational therapists use many different types of reasoning, which may include procedural, interactive, pragmatic, conditional, and narrative thinking. The practice of occupational therapy requires the use of scientific and objective knowledge used in procedural reasoning; the understanding of the illness experience based on the subjective reality of each individual client used in interactive reasoning; and the use of conditional reasoning that integrates objective and subjective information with contextual factors. This is the melding of information from the person, environment, and occupation.

In a client-centered practice, the activities, roles, and tasks of the person are considered as are systems and services that can support the person. The client is an active participant in the intervention process and assumes responsibility for his or her care. The therapist collaborates with the client in establishing treatment priorities and provides education, information, and resources in the community to help clients develop skills and behaviors that prevent disabilities and promote healthy lifestyles (Law, 1998).

In a study by Neistadt (1995), 99% of occupational therapists who were surveyed reported that they routinely identify clients' priorities for treatment, although more formal means of assessment would ensure that all clients were helped to delineate their goals. Northern and colleagues (1995) found that therapists did involve patients and families in the goal-setting process, although there were some discrepancies in the verbal preparation of client and family for intervention and potential outcomes; in attempts to elicit client concerns; and in the level of collaboration to establish treatment goals. Occupational therapists involve their clients in the treatment process. A client-centered approach has been shown to result in shorter hospital stays, better goal attainment, and improved client satisfaction (McAndrew, McDermott, Vizakovitch, Warunek, & Holm, 1999).

Occupation-Based

Occupation is used to organize and define occupational therapy's domain of concern (AOTA, 1995a). The unique focus on occupation is a distinguishing feature of our profession (Rogers, 2007). It is the client's designation of the meaning and importance of each occupation or activity that is the focus of intervention. This is consistent with the occupational therapy views of the relationship between occupation and

health and that people are occupational beings (AOTA, 2008, p. 625). By using these everyday activities, or occupations, increased functional performance that is meaningful to the client is the outcome of occupational therapy intervention. Purposefulness helps to organize while meaningfulness of activities motivates clients (Trombly, 1995).

Moyers (1999) lists nine principles of occupation that guide occupational therapy interventions:

1. Occupations act as the therapeutic change agent to remediate/restore impaired abilities or capacities in the performance components
2. Occupations facilitate transfer of performance component skills to multiple contexts
3. Occupations are selected to enhance motivation for making change
4. Occupations promote self-exploration and identification of values or interests
5. Chosen therapeutic occupations start with the current capacity of the client
6. Occupations create opportunities to practice skills
7. Occupations are selected to support the most appropriate intervention approach
8. Active engagement in occupations produces feedback that successively grades performance
9. Successful occupational experiences are necessary for achieving goals (pp. 270-272).

These principles of occupation apply to all models, frames of references, and interventions relevant to occupational therapy.

Domain of Occupational Therapy

The OTPF identifies six specific domains of occupational therapy practice. The first, areas of occupation, includes many of the same items that are classified as activities and participation in the ICF model. Areas of occupation include activities of daily living (ADLs), instrumental activities of daily living (IADLs), rest and sleep, education, work, play, leisure, and social participation. Improvement or enhancement of occupational performance is often a desired outcome of intervention. Occupations will be defined by the client as part of an occupational profile in which the therapist gains an understanding of the client's history, interests, values, and priorities that forms the basis of intervention.

The remaining five aspects of the occupational therapy domain are factors that may influence the client's ability to successfully engage in occupations and participate in health-promoting activities. These include *client factors* (body functions, body structures, values, beliefs, and spirituality); *performance skills* (sensory and perceptual skills, motor and praxis skills, emotional regulation skills, cognitive skills, and communication and social skills); *performance patterns* (habits, routines, roles, and rituals); *context and environment* (cultural, physical, personal, social, temporal, and virtual); and *activity demands* (objects, space, social demands, sequencing, and timing; required actions, required body functions, and required body structures. All of the aspects of the occupational therapy domain interact to influence the client's performance.

Contextual factors are those related to the physical environment, cultural and social systems, simulation of environmental conditions, and spiritual aspects of being (AOTA, 2002). This definition of contextual factors is very similar to that used in the ICF. Environmental factors are those in the natural environment and in the human-made environment and include social attitudes, customs, rules, practices, institutions, and other individuals. Personal factors are those components that are not part of the health condition, including age, race, gender, educational background, experiences, personality and character style, aptitudes, other health conditions, fitness, lifestyle, habits, upbringing, coping styles, social background, profession, and past and current experience (WHO, 2001).

Occupational therapists also conceptualize occupational performance as being a function of activity demands and client factors. Activity demands are those variables directly related to purposeful activities in which the client engages. Whether the activity demands are too great for the client depends on the client's abilities and performance skills. Abilities are related to learning and involve cognition and social-emotional and physical factors. Performance skills are observable and relate to successful participation in activities.

Occupational Therapy Process

The occupational therapy domain and occupational therapy process "are inextricably linked" (AOTA, 2008, p. 627). The occupational therapy process includes evaluation, intervention, and outcomes. These are shown in Table 1-1.

Evaluation

The OTPF describes assessment as a process that involves two steps. Step one is assessment of the occupational profile of the client in order to gather information about the client's interests, values, needs, and goals. By starting the assessment process with the occupational profile, this client-centered focus can be incorporated throughout the treatment process. This assessment stage is where the therapist and client begin the collaborative process of therapy.

Therapeutic rapport is established with the client as the therapist uses his or her own unique characteristics of personality, style, perceptions, and judgments as part of the therapeutic process (AOTA, 2008). The intention is to understand the perspective of the client, with these particular limitations, within the specific context and environment. Clients are considered the experts regarding their own situations and methods for problem-solving. Evaluation does not always have to start with the occupational profile nor is assessment in this area ever completed. Ongoing collaboration between the therapist and client continuously determines if the client's needs and goals are being addressed.

Table 1-1

OVERVIEW OF OCCUPATIONAL THERAPY PROCESS

OCCUPATIONAL PROFILE	*INTERVENTION PLAN*	*OUTCOME MEASURES*
Who is the client?	Plan that includes:	Select outcome measures
Why is the client seeking services?	• Objective and measurable goals with timeframe	• Occupational performance
What areas of occupation are affected?	• Theory and evidence	• Client satisfaction
• ADL	• Create or promote (health promotion)	• Adaptation
• IADL	• Establish or restore (remediation/	• Health and wellness
• Work	(biomechanical/NDT/cognitive-perceptual)	• Prevention
• Play	• Maintain	• Quality of life
• Leisure	• Modify (rehabilitation: adaptation/ compensation	
• Social participation	• Prevent (disability prevention)	
Contexts	Mechanisms for delivery:	
• Life experiences	• Who will deliver.... role delineation	
• Values	• Types of intervention	
• Interests	• Frequency, duration	
• Previous patterns of engagement	• Outcome measures	
• Meanings of patterns	• D/c needs and plans	
Client's occupational history	• Recommendations or referrals	
Client's priorities and targeted outcomes		

ANALYSIS OF OCCUPATIONAL PERFORMANCE	*TYPE OF INTERVENTION*	*MEASURE AND USE OUTCOMES*
• Performance skills (motor, process, communication/interaction)	Therapeutic use of self	• Compare goal achievement to targeted outcomes
• Performance patterns (habits, routines, roles)	Use of occupations or activities	• Assess outcome results
• Factors (context, activity demands, client)	• Occupation-based	
	• Purposeful activity	
	• Preparatory	
	Consultation	
	Education	

In step two, an analysis of the client's occupational performance is done. Occupational performance is the interaction of the client, context, and activity that enables successful engagement in the areas of occupation. Areas of occupation, performance skills, patterns, contexts, activity demands, and specific client factors are considered as to how these might enhance or hinder engagement in desired occupations. Step two is more focused on the component factors leading to the occupational performance participation restrictions identified in step one. The client's actual performance may be observed in the context in which it normally occurs so that performance skills and patterns can be clearly seen.

Intervention

Assessment and intervention in occupational therapy are based on the theoretic understanding of the problems that are presented by the client. How the therapist views the restrictions in participation influences how he or she would assess and provide treatment.

Occupational therapy interventions include occupation-based intervention, purposeful activity, and preparatory methods (Table 1-2). Additional interventions include consultation, education, and advocacy. These last three interventions are less germane to this textbook so will not be discussed in detail.

Table 1-2

Comparison of Occupational Therapy Remediation Intervention Continua

OT Practice Framework	*Pedretti*	*Fisher*
Preparatory Methods Prepares client for occupational performance. Includes sensory input, physical agent modalities, orthotics/splinting, exercise.	**Adjunctive Methods** "Preliminary to the use of purposeful activities and that prepare the client for occupational performance." Include exercise, orthotics, sensory stimulation, physical agent modalities, ROM, inhibition/facilitation techniques. Necessary to provide structural stability, prevent deformities, provide rest for a part, to increase function in client factors (body structure/function).	**Exercise** Rote exercise and practice activities. A purpose but no goal. Little meaning.
Purposeful Activity Goal directed behaviors or activities within therapeutically designed context that leads to occupation. Examples: practice slicing vegetables, role play to manage anger.	**Enabling Methods** Intermediate activities. Practice specific motor patterns. Train in perceptual and cognitive skills. Practice sensorimotor skills. Examples: inclined sanding boards, cone stacking, puzzles, fastening boards, work simulators, pegboards, computer programs. Lack client-centered goals.	**Contrived Occupation** Exercise with added purpose or occupation with contrived component. Little meaning. Examples: exercise embedded in an activity; pounding nails into a board to pretend to build a birdhouse.
	Purposeful Activities Identifiable goal and frequently areas of occupation are addressed. Skill generalization greater than for adjunctive or enabling methods.	**Therapeutic Occupation** Client actively participates in areas of occupation. Client sees task as purposeful and meaningful. Real objects used in context. Still focused on remediation.
Occupation-Based Activity Actual occupation part of their own context and meeting their goals. Examples: grocery shopping, dressing without assistance.	**Occupation-Based Intervention** Includes information about client needs, wants, goals, expectations. Most beneficial to client and most challenging. Activities in appropriate context and match client goals. Goal directed, meaningful.	**Adaptive or Compensatory Occupation** Active participant in areas of occupation that they choose. Focus on improved performance in areas of occupation May include assistive devices, teaching alternative or compensatory strategies, modification of environment.

Adapted from Fisher, A. G. (1998). Uniting practice and theory in an occupational framework: 1998 Eleanor Clarke Slagle lecture. *Am J Occup Ther, 52*(7), 509-521; Pedretti, L. W. (1996). *Occupational therapy: Practice skills for physical dysfunction* (4th ed.). St Louis, MO: C.V. Mosby; and American Occupational Therapy Association (2002). Occupational therapy practice framework: Domain and process. *Am J Occup Ther, 56*(6), 609-639.

Occupation-Based Intervention

Occupation-based activities are client-centered activities, collaboratively chosen by the client and therapist, that are meaningful and relevant to the client in the expected environment. The actual task is done in the same context as is typical that meets the client's goal. This is the most beneficial and most challenging level of intervention. Fisher (1998) called this adaptive or compensatory occupation, which comprised active participation in chosen occupations but also included using assistive devices, teaching alternative methods, or modifying the environment as goals of intervention. The intervention is focused on improved occupational performance and is not directed toward remediation of impairments.

Purposeful Activity

Purposeful activity is defined as "goal directed behaviors or activities within therapeutically designed contexts that lead to occupation" (AOTA, 2008, p. 674). Examples of purposeful activity would be to practice slicing vegetables for a salad or to practice transfers in and out of a bathtub.

Pedretti (1996) and Fisher (1998) developed models that further delineated this level of intervention. In Pedretti's model, purposeful activities have an identifiable goal, and frequently areas of occupation are addressed. The focus of purposeful activities is on skill generalization. Enabling methods are intermediate activities for the purpose of practicing specific motor, perceptual, or cognitive skills. Examples of enabling methods would be computer programs to increase attention or having a client replicate a pegboard design. Enabling methods do not necessarily include client-centered goals.

Fisher (1998) divides the OTPF category of purposeful activity into therapeutic occupation and contrived occupation. The client participates in areas of occupations, in tasks that are seen as purposeful and meaningful, when engaged in the stage of therapeutic occupation. Real objects are used in natural environments but the focus is on remediation of particular skills. Contrived occupation is exercise with added purpose or occupation with a contrived component. There may be a purpose or a goal, but it originated with the practitioner so it is less meaningful to the client. The focus is on remediation of impairments, and the objects and the potential purpose or meaning is contrived. Exercise may be embedded into an activity such as reaching into the cupboard to simulate getting dishes with the intention of increasing range of motion. Or another variation might be occupation with a contrived component where the objects are real but the task has no purpose. For example, pounding nails into a board to pretend to build a birdhouse. The purpose and meaning are contrived.

Occupational therapy intervention that is primarily in the therapeutic occupation or compensatory adaptive models is more client-centered and provides meaningful and functional outcomes for the client.

Preparatory Methods

Not all clients who are seen by occupational therapists are ready to participate in occupations or purposeful activities. Preparatory methods are used to prepare the client for occupational performance and may include physical agent modalities, orthotics/splinting, or exercise as examples. Pedretti (1996) calls these adjunctive methods, which also include range of motion, inhibition or facilitation techniques, and sensory stimulation. Fisher (1998) calls rote exercise and practice activities exercise. These are activities done for a purpose but with little meaning.

The activities originate with the therapist and not the client, with the focus on remediation of impairments at the client factor level (see Table 1-2).

Occupation-based activities engage the client in the intervention process and have meaning and relevance to them. Infusing occupation into purposeful activities and preparatory methods is part of the creative challenge therapists may face. Barriers to occupation-based intervention may include limited institutional support with the expectation that preparatory methods alone will enable successful integration into roles once the client is discharged. Reimbursement is not always straightforward, so there is a need to justify treatment (Rogers, 2007).

Having clients actively participating in choosing priorities and setting goals will engage the client meaningfully in the intervention process and make the intervention more occupation-based (Deshaies, Bauer, & Berro, 2001). Give clients choices of activities. Identify clients with similar interests, and arrange occupation-based groups so that socialization and peer mentoring can facilitate the intervention, and the intervention can be more fun and meaningful. Use the facility to its fullest potential: have the client use the vending machines; go to activity rooms; walk on the hospital grounds and community areas. Go on outings to homes, job sites, and schools or to other places that have meaning for the client (Deshaies et al., 2001; Rogers, 2007).

Intervention Approaches

Systems-based or occupation-based models such as the PEO provide an overarching theory about the relationship between occupation, the person, and the environment. How is this theory used in practice? Theories applied to individual clients in specific practice situations are considered frames of reference, practice models (Kielhofner, 2009; Reed & Sanderson, 1999), or intervention approaches. Using frames of reference, practitioners link the "concrete particular with the abstract general" (Mattingly & Fleming, 1994).

Intervention is guided by both the occupation-based models and by frames of reference.

Trombly (1993) calls this "layers of occupational functioning," where all parts of domains and roles need to be considered in treatment, including tasks, activities, abilities, and capacities. Knowing that the client wishes to resume a homemaking role would also entail assessment of the ability to prepare meals, perform specific tasks related to meal preparation, and have the necessary physical and cognitive capacities to perform specific activities.

Frames of reference are not necessarily occupation based. These models of practice were developed as guidelines to address specific disability areas. Several different practice models may be used simultaneously to address different limitations. Initially, restorative/restoration approaches may be used with the client to improve limitations at the body structure