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Cephalocaudal-Remote Approach

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Abstract

This opinion paper introduces a global, top-down, bottom-up, and lateral perspective on occupation, known as the Ledesma Cephalocaudal-Remote Approach, which can be used to build an integrated, holistic occupational therapy practice. This approach combines the Ayres (1960, 1966, 1972, 1979) cephalocaudal and vestibular sensory-motor development (confirmed by Lane et al., 2019); the Wilke et al. (2017) remote interoceptive, proprioceptive, and nociceptive stretching, based on Myers (2017) myofascial chain approach; the Serino (2019) peripersonal and multisensory-motor approach; the Leisman et al. (2016) bidirectional dynamic influence of motor activity and cognition approaches, and the Sadil (2019) evidence for rapidly learned low-level associations without top-down knowledge approach. The Ledesma Cephalocaudal-Remote Approach leads both practitioner and client through conscious sensory-motor experiences that develop and maintain a healthy functional self-relationship. Engaging in whole human organism range of motion/position activity develops the physical health of embodied occupational capabilities. Examples include lying down, crawling, kneeling, sitting, standing, and walking. Therapeutic use of self is employed consciously as an interpersonal tool by the occupational therapist to experience whole human organism range of motion/position activity. Once the therapist develops proficiency, they then employ therapeutic use of self again to mentor the client. This practitioner mode redefines the role of the occupational therapist from facilitator to mentor, which is a significant contribution to the existing "modes of practice" in the intentional relationship model (Taylor, 2008). A description of experiencing and teaching the first (physical) phase of practice, known as "Beginner Phase," is provided to illustrate application of the model in occupational therapy practice.

Capstone Opinion Paper

The occupational therapy (OT) profession has been called to embrace a more integrated and holistic approach to practice (American Occupational Therapy Association [AOTA], 2011, 2017, 2021; Reitz et al., 2020). Holistic occupational therapy enhances occupational engagement of persons, groups, and populations through the use of client-centered and occupation-based interventions (AOTA, 2011, 2017, 2021; Reitz et al., 2020). At the same time, the interprofessional (IP) community has been tasked to optimize biomechanics during human movement and to develop globally targeted holistic intervention strategies of remote stretching (Burk, 2019; Wilke et al., 2017) based on whole human organism (Dischiavi et al., 2018; Garrison, 2001) myofascial chains (Meyers, 2014). Despite these requests, neither occupational science researchers nor OT practitioners have yet developed and presented a client-centered, occupation-based *embodied occupational capability model*, or EOCM.

Statement of Purpose

A globally targeted holistic intervention strategy using a hands-to-head remote-myofascial chain approach would increase OT's ability to provide a functional whole system intervention. However, this paper takes a more expansive and global, top-down (Leisman et al., 2016), bottom-up (Lane et al., 2019; Leisman et al., 2016; Myers, 2014), and lateral (Sadil et al., 2019) approach on occupation. From a *top-down* approach, cognition governs and creates perception. Behavior employs information from higher order cognitive processes to construct physical experiences. From the *bottom-up* approach, perception directs cognition. Observable patterns in the environment inform higher order cognitive processes to influence decisions and to determine behavior. From the *lateral* approach, learning associations and memory are directly linked at lower perceptual levels without top-down knowledge, which allows behaviors to be

synchronized independently of higher order cognitive processes. The top-down, bottom-up, and lateral approaches on occupation describe the neuroplastic connection the master occupational body brain (MOBB), its skin-skeletal muscle-on-fascial chains, and the peripersonal environment (Serino, 2019) share with one another. This supports whole human organism range of motion/position and develops the physical health of embodied occupational capabilities (EOCs).

Capstone Opinion Paper Objectives

This opinion paper conceptualizes EOCs and describes how they are strategically applied to support the education model of *whole human organism success*, or WHOS (Dischiavi et al., 2018; Garisson, 2001).

Objective 1: Present variation of bottom-up, top-down, and lateral principles to fill a relevant functional behavior gap. This variation will combine the following theorists' concepts: 1) Ayres's (1960, 1966, 1972, 1979) cephalocaudal and vestibular sensory-motor development (confirmed by Lane et al., 2019); 2) Wilke et al.'s remote stretching based on Myers's (2014) myofascial chain approach; 3) Serino's (2019) peripersonal and multisensory-motor approach; 4) Leisman et al.'s (2016) bidirectional dynamic influence of motor activity and cognition, and 5) Sadil's (2019) evidence for rapidly learned low-level associations without top-down knowledge. The bottom-up, top-down, and lateral variation principles are described as a transactional perspective on occupation (Aldrich, 2008; Bunting, 2016). Finally, a discussion of how to achieve whole human organism success is provided.

Objective 2: Introduce the following elements of occupational performance that maintain the physical health component of EOCs: Component 1 (Midline Self-Care Skill); Component 2 (Occupational Environments and the MOBB Theory); and Component 3 (Ledesma Cephalocaudal-Remote Approach).

Objective 3: Provide a working example that describes the process of teaching the EOCM to a client: Beginner's Phase, Reciprocal Relational Functional Coordination, and Midline Self-Care Skill.

Objective 1: A Transactional Perspective on Occupation

The transactional perspective (Aldrich, 2008; Bunting, 2016) can be understood when neuroplastic (Lane et al., 2019; Myers, 2014; Wilke et al., 2017) principles in the *immediate* and *intermediate* occupational environments are integrated with peripersonal (Serino, 2019) principles found in the *extended* occupational environment. The *immediate environment* is the elemental space of the skin-skeletal muscle-on-fascial chain mechanism. The *intermediate environment* is the transitional space where the invisible vertical-horizontal-coronal midline self-care skill originate directly from the central skin parameters of the physical body. The *extended environment* is the abstract space where vertical-horizontal barriers and medial-to-lateral equidistant end point landmarks exist.

The author's interpretation is that Ayres's cephalocaudal-vestibular principles and Wilke et al.'s (2017) remote stretching based upon Myers's myofascial chain principles occur in the immediate and intermediate occupational environments as bottom-up approaches (Ayres, 1960, 1966, 1972, 1979; Meyers, 2014). Serino's (2019) peripersonal space and multisensory-motor principles occur in the extended occupational environments as a bottom-up approach. Leisman et al.'s (2016) bidirectional dynamic influence of motor activity and cognition principles occur in the immediate occupational environment as a top-down or a bottom-up approach. The author argues that the MOBB theory occurs in all three occupational environments as a lateral approach (Sadil, 2019).

The EOCM incorporates: 1) Ayres's (1960, 1966, 1972, 1979) sensory integration principles for cephalocaudal and vestibular sensory-motor receptor development; 2) Wilke et al.'s (2017) remote interoceptive, proprioceptive, and nociceptive sensory-motor receptor development based on Myers's (2014) myofascial chain principles; 3) Serino's (2019) peripersonal space principles for vestibular activity and tactile stimuli on the body with visual or auditory information related to external objects in the environment and for establishing multisensory-motor performance function for the MOBB; 4) Leisman et al.'s (2016) bidirectional principles to establish dynamic motor influence on cognition for the MOBB, and 5) Sadil et al.'s (2019) lateral approach principles to establish a theoretical premise for the MOBB theory, the three occupational environments, and the functional self-relationship.

Objective 1: Whole Human Organism Success

All the above theorists have addressed specific components of body systems. However, they have not introduced a more conscious holistic physical integration approach to perpetuate the education model of WHOS. Therefore, a newly proposed MOBB theory of multisensory-motor performance (Bosse et al., 2008; Damasio, 1999; Leisman et al., 2016; Serino, 2019) is needed. A whole system is successfully integrated when the occupational environments carry out simultaneous synchronous transactions with one another (Garrison, 2001), perpetuating WHOS. This activates therapeutic use of self (Solman & Clouston, 2016) to entrain a more conscious holistic multisensory-motor performance (Bosse et al., 2008; Damasio, 1999; Leisman et al., 2016; Serino, 2019), which develops and maintains the physical health of EOCs.

Objective 2, Component 1: Midline Self-Care Skill

This paper introduces a new holistic OT self-care skill that remodels and remolds the daily functional biomechanical structure of the skin-skeletal muscle-on-fascial chain mechanism

(Dischiavi et al., 2018; Garrison, 2001), known as midline self-care skill. It is a newly proposed sub-category of occupation that supports activities of daily living (ADL), such as personal hygiene and grooming or functional mobility (AOTA, 2020). Midline self-care skill addresses occupational engagement behaviors in order to further develop EOCs. The EOCs include lying down, crawling, kneeling, sitting, standing, walking, or any derivations thereof.

Principal approaches found in the immediate and intermediate occupational environments, known as neuroplastic pathways (Lane et al., 2019; Myers, 2014), are integrated with peripersonal pathways (Serino, 2019) found in the extended occupational environment. These pathways facilitate WHOS. Developing the midline self-care skill begins by building a functional self-relationship with the extended occupational environment and the immediate and intermediate occupational environments of the physical body. Therapeutic use of self (Keppler, 2018; Serino, 2019; Solman & Clouston, 2016) is activated consciously by the practitioner as an interpersonal tool to experience applying midline self-care skill. Once the practitioner develops midline self-care skill, they then employ therapeutic use of self again to mentor the client. This *practitioner mode* redefines the role of the OT from facilitator to mentor, which is a significant contribution to the existing "modes of practice" in the intentional relationship model (Taylor, 2008).

Range of Motion and Range of Position

Whole human organism range of motion/position is an automatic reflexive behavior that occurs in the MOBB. The EOCM addresses whole human organism range of motion/position using upright motions/positions of counterbalance to build upon partial range of motion/position strategies. The untouched or undeveloped neuroplastic pathways (Lane et al., 2019; Myers,

2014) of EOCs are the immediate occupational environments where the primitive neurodevelopmental skin and skeletal muscle connect intimately with the surrounding fascial chain mechanism (Bordoni et al., 2019). The intermediate occupational environment is where partial range of motion connects to partial range of position. Examples are the transitional movements that connect: 1) a supine or lying down position into a sitting position, and back into a supine or lying down position; and 2) the position of standing into a sitting position, and back into a standing position.

Objective 2, Component 2: The Occupational Environments and the MOBB Theory

The elemental space is located in the skin-skeletal muscle-on-fascial chain mechanism, which contributes physical dimensions of depth, height, length, and width to the immediate occupational environment. The transitional space is located in the intermediate occupational environment where transitional movement occurs and structural landmarks of midline self-care skill are located. In this space, midline self-care skill and its invisible vertical-horizontal-coronal midlines originate directly from the central skin parameters of the physical body. The physical abstract space in the extended occupational environment is known as peripersonal space (Serino, 2019). It is an interface between the individual and the environment (Serino, 2019) where structural parameters of peripersonal space are located, known as vertical and horizontal barriers and medial-to-lateral equidistant end point landmarks. They are physical lines that represent the vertical, horizontal, and coronal planes, including the parasagittal. The structural parameters originate from the vertical-horizontal-coronal axes of the body and extend directly into the peripersonal space (Serino, 2019) to create the extended occupational environment. This further defines the space of the self (Serino, 2019).

The MOBB is divided into four occupational body brains. The core element is the skeletal muscle-on-fascia body brain, which serves as the conceptual framework for the multisensory-motor performance of the MOBB skin-skeletal muscle-on-fascial chain mechanism (Bosse et al., 2008; Damasio, 1999; Leisman et al., 2016; Serino, 2019). The other occupational body brains will be discussed in future articles. Employing the MOBB and its skin-skeletal muscle-on-fascial chain mechanism builds a stronger functional self-relationship, which maintains the daily physical health of EOCs.

Creating Successful Simultaneous Synchronous Transactions

A new simultaneous synchronous occupational performance skill is needed to perpetuate the education model of WHOS. This helps integrate and carry out successful simultaneous synchronous transactions (Garrison, 2001) between the occupational environments. For purposes of this paper, simultaneous will refer to whole human organism *range of position* as a beginning or ending static activity that occurs at one time. An example of a beginning static activity is the simultaneous range of position that initiates whole human organism range of motion, such as the upright half sitting-half standing position of counterbalance. Synchronous refers to whole human organism *range of motion* as a dynamic activity that begins when periodic intervals are activated and ends when periodic intervals are deactivated. An example is the natural synchronous momentum the whole human organism activates during range of motion activity.

Objective 2, Component 3: Ledesma Cephalocaudal-Remote Approach

Midline self-care skill integrates traces of primitive neurodevelopmental behavior such as the symmetrical tonic neck reflex, or STNR, and asymmetrical tonic neck reflex, or ATNR (Bruijn et al., 2013; Gieysztor et al, 2018). The retained effects of the STNR or ATNR can be activated by daily stress, tension, or old chronic pain patterns. This activation occurs during

everyday occupational performance activities, such as driving. Midline-self-care reflects a new globally targeted, neurobiological, client-centered, and occupation-based holistic frame of reference known as the *Ledesma Cephalocaudal-Remote Approach, or* LCRA. This approach takes Ayres's cephalocaudal-vestibular sensory-motor development (1960; 1967; 1972; 1979) and Wilke et al.'s (2017) remote stretching based on Myers's myofascial chains (2014), which support restorative and compensatory methods, and adds a corrective method of linear dynamics to provide holistic occupational therapy. The LCRA corrects neuroplastic *counter-imbalance associations* (Aldrich, 2008), which occur between the multisensory-motor receptors of the cephalocaudal trunks and remote upper-lower limbs.

Remote Stretching Versus the Ledesma Cephalocaudal-Remote Approach

Existing remote-myofascial chain principles activate remote stretching from the lower posterior kinetic chain, specifically the superficial back line, or SBL (Burk, 2019). Mechanical force is transmitted through the SBL, causing increased range of motion effects towards distant ends, such as the neck (Wilke, 2017). The transitional space in the intermediate environment consists of the cephalo-caudal trunks, remote upper-lower limbs, and the structural landmarks-parameters of midline self-care skill. This transitional environment serves to connect the immediate environment of elemental space to the extended environment of peripersonal space.

The LCRA principles activate a global concentric and eccentric stretch, which de-adheres the immediate environment. This occurs through the application of whole human organism counterbalance associations. Reciprocal relational functional coordination helps correct 3-planar global counter-imbalance associations by activating structural landmarks-parameters in the intermediate and extended environments. This transacts (Garrison, 2001) a synchronous weightbearing-non-weightbearing bodyweight force through the cephalo-caudal-trunks and the

remote upper-lower limbs which increases range of motion/position to the whole human organism. A counterbalance association consists of placing the intermediate occupational environment in the same equal but opposite joint direction in relationship to the repetitive forward-rotational motions/positions EOCs activate daily. The counterbalance association resets these repetitive motions/positions by activating the EOCs in a counterbalanced direction. This process re-creates the same forward-rotational range of motions in an opposite backward-rotational direction and identifies them as joint end positions. These positions transition the daily functional biomechanical structure of midline self-care skill towards a vertical and horizontal threshold to direct a transfer of counterbalanced mechanical bodyweight force associations to the corresponding skin-skeletal muscle-on-fascial chain mechanism.

Objective 3: Beginner's Phase, Reciprocal Relational Functional Coordination, and Midline Self-Care Skill

Combining neuroplastic (Lane et al., 2019; Wilke et al., 2017) and peripersonal principles (Serino, 2019) transforms existing occupational therapy practice into a functional self-relationship for the client. The practitioner helps the client build a more active functional self-relationship over time and therefore improve daily occupational engagement. This occurs in four phases of whole human organism range of motion/position activity: *Beginner* (Cephalo-Caudal Trunks and Remote Lower Limbs); *Intermediary* (Cephalo-Caudal Trunks and Remote Upper Limbs); *Advanced* (Cephalo-Caudal Trunks and Remote Lower-Upper Limbs), and *Expert* (Cephalo-Caudal Anchor for Human Brain Development). The Beginner Phase is a daily low impact clinical workout that stabilizes and strengthens midline self-care skill and entrains for conscious and physical multisensory-motor receptor performance. This Phase includes a short-

term *Embodied Occupational Capability Gym* set-up, which allows clients to safely exercise midline self-care skill at home between therapy appointments.

To introduce the EOCM to a client in holistic occupational therapy practice, first, the OT shows the client a picture of the muscular system (Wood et al., 2020). They then explain how it presents the skeletal muscles as independent, isolated structures. The OT then introduces pictures of the skin-skeletal muscle-on-fascial chains to the client and explains how they are interconnected (i.e., anterior, posterior sections). The OT and client then talk about how viewing the three layers of skin, the skeletal muscle, and the fascial chain *holistically* improves the ability to support healthy function. The OT demonstrates which specific skin-skeletal muscle-on-fascial chain will be addressed by reaching to touch these sections on their own body (e.g., anterior left section compared to anterior right section or the posterior left section compared to the posterior right section). The client then identifies the same specific skin-skeletal muscle-on-fascial chain by physically reaching to touch the same sections on their body.

Once the client gains multi-modal understanding, they begin to listen and to observe how the OT explains and performs whole human organism flexion/extension and right/left rotation with reciprocal relational functional coordination in an upright half sitting-half standing position of counterbalance. Listening and observing anchors learning and demonstrates to the client how conscious and physical multisensory-motor performance takes place (Bosse et al., 2008; Damasio, 1999; Leisman et al., 2016; Serino, 2019; Solman & Clouston, 2016).

The vertical-horizontal-coronal midline self-care skill is activated to counterbalance the cephalo-trunk downward and forward in an arcing motion so the head reaches to align with the central horizontal barrier while the horizontal caudal midline self-care skill reaches to align with the central vertical barrier in the back wall. This movement is performed in tandem with a same

equal but opposite forward and backward linear rocking motion to the cephalo-caudal trunks and remote lower limbs. The leading knee then maintains contact with the forward vertical equidistant mid-end point landmark at 90 degrees of knee flexion while the cephalo-trunk and corresponding upper limb right rotate to reach the superior medial equidistant end point landmark. This is done in tandem with the medial-to-lateral equidistant end point landmark of the foot so the leading foot reaches 3 shoe widths laterally with the foot/toes pointing forward in order to arrive at a mid-point foot position. A counterbalance is then performed in the same equal but opposite directions.

A counterbalance activates the vertical-horizontal-coronal caudal midline self-care skill so the leading foot arrives at the forward mid-medial to lateral equidistant end point landmark. The vertical-horizontal midline self-care skill in the cephalo-trunk then counterbalance by extending downward and backward then right rotates to touch and align with the central vertical barrier of the back wall while the leading knee maintains contact with the vertical mid-equidistant end point landmark. The whole human organism range activity is then repeated on the opposite side by switching the forward leading leg to the back non-leading leg position. Aligning midline self-care skill with its barriers and equidistant end point landmark counterparts corrects counter-imbalance associations in the cephalo-caudal trunks and remote-lower limbs.

The OT then asks the client to explain and perform reciprocal relational functional coordination with whole human organism flexion/extension/rotation in an upright half sitting-half standing position of counterbalance. This activates conscious and physical multisensory-motor receptor performance (Bosse et al., 2008; Damasio, 1999; Keppler, 2018; Leisman et al., 2016; Serino, 2019; Solman & Clouston, 2016) and entrains visual, auditory, and kinesthetic learning. The client is then asked to access their own visual and auditory thoughts and kinesthetic

feelings of conscious learning (Keppler, 2018; Serino, 2019; Solman & Clouston, 2016) after performing each whole human organism range of motion/position activity. This practice teaches the client what performing whole human organism range of motion/position activity looks, sounds, and feels like. Asking the client to report on their experience also helps them identify the elements of their conscious learning (Keppler, 2018; Serino, 2019; Solmon & Clouston, 2016). The conceptual and experiential feedback the client provides to the practitioner can then be anchored to their performance of midline self-care skill. The lateral approach on occupation stimulates rapidly learned low-level perceptual associations, which allows the occupational engagement behaviors of EOCs to be synchronized independently of higher order cognitive processes. This approach guides the MOBB theory and entrains the client to continue to build a functional self-relationship.

Conclusion

This opinion paper has introduced a more expansive and global definition of holistic occupational therapy. Some practitioners will have difficulty accepting and applying the education model of WHOS in practice due to beliefs they developed during their occupational therapy education. However, using a segmented approach to apply rehabilitation and biomechanical concepts limits the physical health of clients. The EOCM combines whole system thinking (Plank et al., 2019) with a systemic approach to improve physical health, as demonstrated by WHOS. The WHOS concept activates the LCRA to carry out successful simultaneous synchronous transactions between the occupational environments (Garrison, 2001). True understanding of whole system thinking (Plank et al., 2019) is a pre-requisite to build a solid holistic occupational therapy practice. Developing this understanding entails integrating old with new beliefs, which starts by physically performing and experiencing each embodied

occupational capability, which unifies the immediate, intermediate, and extended occupational environments. Arguably, the educational model of WHOS leads the practitioner and client into a functional self-relationship for a conscious and physical multisensory-motor experience.

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