

Editorial

Rewire, Rebuild, Restore: Core Principles of Corrective Exercise for Clinicians

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Despite growing interest in corrective exercise (CE), many professionals neglect the foundational principles. Also, the sources have not fully covered the fundamental principles of CE, underscoring the need for review and consolidation of CE principles. In this article, the most crucial CE principles that CE specialists (CESs) must consider are briefly discussed, including periodization, preparation, rest, skill, individualization, specific adaptation to imposed demands (SAID), progression, regression, optimization, integration, monitoring, interference, reversibility, and variation. After a comprehensive postural assessment, a CES must establish goals and develop a well-designed plan to achieve them.

The periodization principle of the CE refers to the structured planning of interventions over time. Periodization usually has three phases: microcycle, mesocycle, and macrocycle. The microcycle phase usually lasts for 1-7 days and focuses on achieving short-term goals, such as releasing inhibited muscles. The mesocycle phase is longer than the microcycle phase; it usually lasts for 2-6 weeks. The macrocycle phase, which is longer than the mesocycle phase, encompasses the overall CE program.

Based on the preparation principle, the client should warm up the body before executing special CEs. A

well-designed warm-up boosts blood flow to muscles, improves joint mobility, and increases nerve conduction velocity, thereby enhancing muscle readiness and neuromuscular coordination.

The rest principle highlights the critical role of recovery in the supercompensation and adaptation processes. To correct postural abnormalities or dysfunctional movement patterns, a CES must give the body sufficient time between sessions for repair and adaptation. Without adequate rest, there is an increased risk of overuse injury, fatigue, or even regression.

The skill principle of the CE emphasizes that learning appropriate movement techniques should always precede increasing intensity or complexity. The initial effort focuses on coaching the client on executing each movement with correct alignment of the trunk, upper extremities, and lower extremities, as well as coordination and muscle activation. For example, before adding weight to a squat, the person must first demonstrate the ability to control lower extremity alignment and core stability throughout the movement. This phase is crucial for the nervous system re-education and establishment of efficient movement patterns. Presenting overload too early can reinforce poor habits, movement insufficiency, and increase the risk of injury.

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The principle of individualization is often overlooked, despite being the most important principle in real-world settings. The individualization principle refers to tailoring CE programs while considering each client's unique conditions, abilities, and goals [1]. Personalized CE programs should be designed based on a comprehensive postural assessment, taking into account factors such as gender, age, occupation, and training experience.

Based on the SAID principle, if a client struggles with balance during single-leg balance tests, exercises should specifically target single-leg stability. We can save time by following the SAID principle. In a CE setting, the demands imposed on the body should increase gradually.

The gradual increase in training load to endorse continuous improvement is embedded in the progression principle. After an individual has adapted to a specific training load, gains tend to plateau. Progression can be obtained by increasing frequency, intensity, or duration.

In contrast to the progression principle, the regression principle involves decreasing the CE intensity or complexity to match the client's current ability level, ensuring safe movement without compensatory movement patterns. When a client is unable to perform a CE with proper form because of poor motor control, a simpler version of the exercise is used to build the necessary foundation [2]. This might involve a reduction in range of motion, enhancing stability, or removing external resistance.

Some clients participate in CE sessions solely to engage in daily living activities. Considering this point, based on the optimization principle, an optimal—not maximal—level of function is sufficient. Once the necessary joint mobility in a specific direction is restored to support proper movement patterns and alignment, the focus should shift toward other critical components such as strength and neuromuscular control.

The integration principle focuses on applying improved movement patterns to real-life activities. It is not enough to correct a movement in isolation—lasting results come when those changes carry over to everyday tasks, such as walking or lifting. Without regular evaluation, even the best-designed CE programs can go off track.

The importance of regularly assessing an individual's posture, movement pattern, and response to the CE program is embedded in the monitoring principle. As CEs aim to improve specific movement dysfunctions and postural syndromes, regular evaluation ensures that exercises

are performed correctly and effectively. This involves observing movement quality, checking for compensations, tracking pain levels, and measuring posture both statically and dynamically, as well as strength, flexibility, or stability. Monitoring also helps identify when an exercise needs to be progressed, regressed, or modified to better suit the individual's current abilities and goals.

The interference principle of the CE refers to how certain factors, such as habitual, recreational, developmental, structural, pathological, psychological, physiological, cultural, and occupational factors, can affect the progress of corrective goals by disrupting neuromusculoskeletal adaptations or reinforcing specific patterns. For example, repetitive movements or sustained alignment based on the Kinesiopathologic model proposed by Shirley Sahrmann may interfere with efforts to correct alignment or movement patterns [3]. By minimizing interference, CEs help ensure that CEs lead to meaningful and lasting improvements in movement quality and function.

The reversibility principle reminds us that the training progress can fade if exercise stops for a while, especially if habits or other factors work against it. To avoid losing these gains, it is essential to incorporate corrective strategies, such as postural training, into everyday routines. This involves helping clients gradually apply what they have learned to their daily activities and encouraging them to remain engaged over the long term.

Ultimately, the variation principle of the CE emphasizes the need to incorporate diverse training stimuli to maintain engagement and prevent plateaus in adaptation. By using various modalities such as resistance bands, stability balls, balance tools, and bodyweight exercises, the CEs can target the same movement pattern or muscle group in multiple ways, stimulating different motor units and promoting neuromuscular adaptability.

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