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PREVENTION & REHABILITATION: PATIENT SECTION

Gamification

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Learning new movement skills has always been thought of as occurring as a result of practice. Hours and hours of practice with mastery requiring the magic number of 10,000 h of deliberate practice (Ericsson et al., 1993). We have learned that other than grit, passion, aptitude and/or genetic gifts there are other ways to enhance learning. While instruction is key the question of what and how the instruction should be delivered is also essential.

Gamification is an example of creating a problem-solving environment with camaraderie where tasks can be explored and enhanced in a goal-oriented manner. They are generally partner-based with the emphasis being on novel environmental constraints, safety, and fun. The constraints can be altered based on dynamic system theory (DST) by modifying the *environment*, *task*, or *individual* (Seirul-lo Vargas, 2003). An example of coaching by modifying the environment is having a person squat while facing near a wall. In this instance if someone has a tendency to slump forward or bend excessively from their waist by standing near the wall it will allow them to "figure out" how to keep their back straighter during squatting. Since the person learns this on their own it is more likely to be retained and transfer to later activities and skills.

Studies have shown that if coaching instruction emphasizes the "correct" vs "incorrect" pattern that skill can be acquired more quickly. Paradoxically however its retention actually suffers from this type of training which is called 'blocked' (Battig, 1979). A different form of training called 'random', actually lets a person problem-solve with external feedback from a goal such as jumping as high as possible, or pointing a finger towards a target.

More often than not in life movements are performed in unique rather than stereotypical ways due to changing environmental, tactical or strategic contexts. In fact our brain learns the process of how to adapt via exposure to novel or variable situations. So we should train with this in mind. "The concept of the human beings as complex dynamic systems changes the mechanical view of athletes and the adaptation process based on the computer metaphor. This change in paradigm affects training proposals stemming from classical training theories and leads to a demand for its principles to be updated ….The concept of the correct or right response has been fundamentally changed by the new paradigm. According to the research results obtained by applying DST to the study of human movement, the athlete does not need to know the solution of a new task beforehand." (Seirul-lo Vargas, 2003).

The way we like to think about this is well described by Todd Hargrove (2014), *"Movements are not "right" or "wrong" … it depends on the goal, the individual, the context … Teach movement by giving more choices and awareness, NOT by telling people how to move"*. The famous movement therapist Moishe Feldenkrais went as far as saying "*it is incorrect to correct"*.

Another, way of thinking of skill acquisition is in terms of external and internal cues. Internal cues like "squeeze your glutes" (buttocks) don't work as well in someone squatting as an external cue such as "*imagine a large window between your knees"* (Wulf 2013). The external cues let a person problem-solve or strategize on their own. The muscle symphony is more efficient. Most importantly, when a person problem-solves on their own, rather than being told what to do, the movement pattern is more transferable to their daily activities or sports.

Vladimir Janda a Medical Neurologist and Rehabilitation specialist emphasized that people are less motivated to exercise if they have to be hypervigilent. Thus, he recommended minimizing the stage of motor learning where one is having to be conscious of their form. Instead he suggested that we find the exercises which are more fun and where the person automatically performs them well. This sub-cortical training was in his opinion more likely to "stick". 'Gamification' of exercise focused on this goal.

A final component in training is problem-solving. Most life activities involve decision making in real time. If we "think" it slows us down and we are unable to react efficiently. The movement challenges shown here utilize problem-solving and lend themselves to being reactive in nature since you and your partner move as a unit responding to each other. In the two examples shown here, the partner squat and single leg hinge, the goal is to maintain balance and tension while performing the movement. It's best to figure out what works for you rather than thinking of tightening your abdominal or gluteal muscles. Table 1 summarizes the key points about Gamification.

Partner squat (see Fig. 1)

- Stand facing a partner with your feet about shoulder width apart

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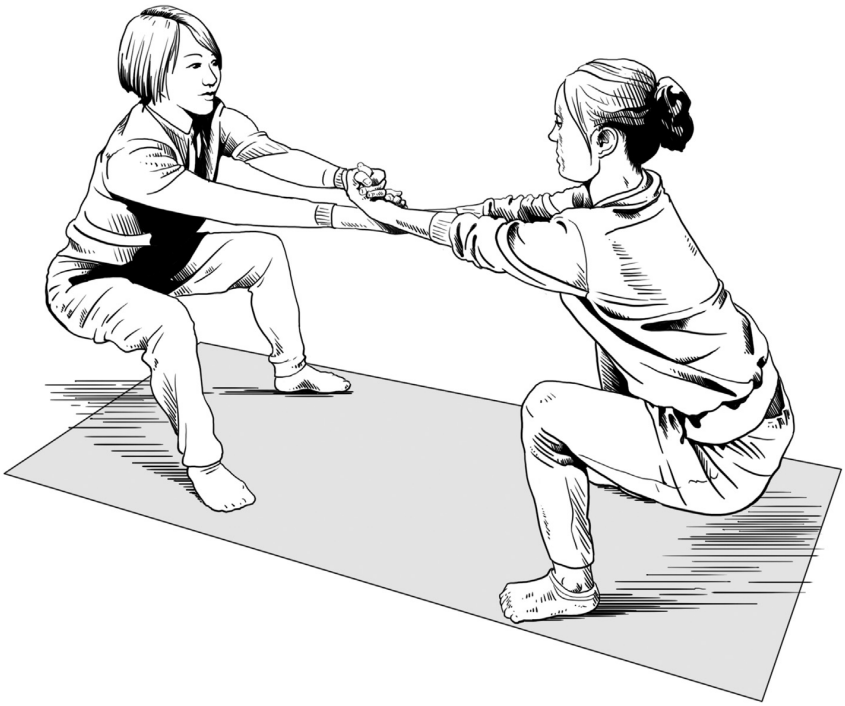

Fig. 1. Partner squat.

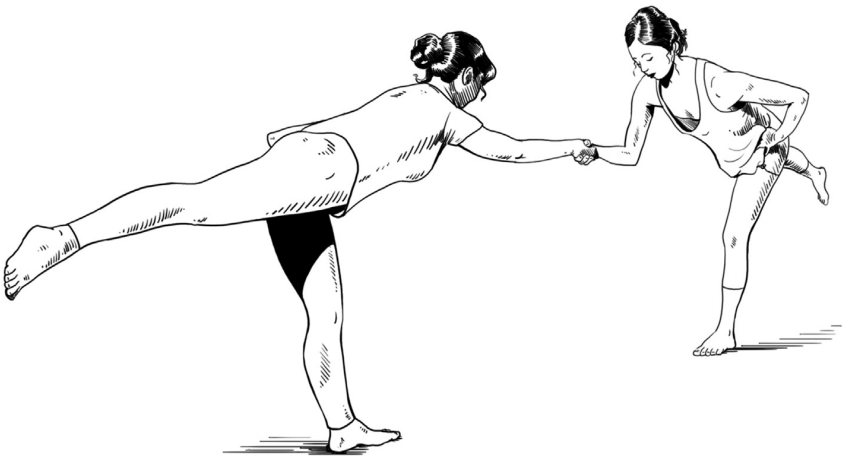

Fig. 2. Partner single leg hinge.

Table 1
Key points for Gamification.

Gamification
Problem-solving
Partner-based
Novelty or Variability
Random > Blocked
Constraints-based learning
External target cue > Internal body cue
Subcortical > Cortical
Reactive decision making

- Cross hands with your partner with your elbows slightly bent
- Walk backwards just enough to feel an increase in tension in your arms
- Slowly squat down until your thighs are parallel to the floor
- Lean back slightly to re-enforce the feeling of tension in your arms and torso
- Hold this position for about 5 s
- Repeat 5–6 times

Progression

- Increase the hold time to 15 s or the repetitions to about 10–12 times.

Single leg hinge (see Fig. 2)

- Face your partner and grasp hands while balancing on 1 leg
- If you are on your left leg use your right hand
- Let the tension between your 2 arms actually support your balance
- Next, reach back with your opposite foot and leg until you feel your support leg is working
- Ideally, you will feel more in your gluteals than your quadriceps (thighs)
- Hold this position for about 5 s
- Repeat 5–6 times

Key

- Try to hinge more from your hip than your knee

Progression

- Increase the hold time to 15 s or the repetitions to about 10–12 times.

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