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Truly Special Populations

Josh MacDonald uses a host of methods to help children move better, and he's finding CrossFit is a great tool for a pediatric occupational therapist.

By Josh MacDonald **August 2010**

Courtesy of Josh MacDonald

Wheelbarrow walking works on both coordination and strength. It can be graded by holding the child's knees or thighs.

CrossFit is the use of constantly varied functional movements performed at high intensity. For most of us, this means spending some time becoming competent at mechanics but focusing mostly on consistency and intensity.

But what if you couldn't even manage the "mechanics" part because of a faulty nervous system or underdeveloped musculoskeletal system? For these clients, CrossFit is still an invaluable tool for progress and improvement.

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Helping Kids Move

As a pediatric occupational therapist, I work with children with a wide variety of diagnoses, including autism, Down's syndrome, cerebral palsy and developmental delay. While each diagnosis is unique, many share some common characteristics. Many of these children have movement disorders that stem from muscle weakness, sensory-processing disorders (see sidebar on Page 4), and severely reduced muscular and cardiovascular endurance. The result is children who struggle to interact with their world independently and safely.

CrossFit-style movements and programming have provided me with a valuable tool for improving the lives of children with disabilities.

As an avid CrossFitter of almost two years, I quickly saw how a focus on quality functional movement patterns could benefit these kids on my caseload. I started dabbling in the use of some of the movement principles and simple workouts during my sessions. But I knew I needed more training and information if I was going to make the most of CrossFit at our clinic. I decided to go to a Level 1 Certification and a CrossFit Kids Certification to make sure I was using the right cues, movement progressions and workouts. Attending these two certifications was well worth the time and price. I learned countless techniques and strategies and developed the ability to adapt CrossFit for use with children. What I had to figure out for myself, however, was how to adapt all of that information to the special-needs population.

In pediatrics, occupational therapy focuses on improving a child's ability to engage in normal, daily activities. This includes, but is not limited to, self-care tasks (i.e., bathing and grooming), visual motor tasks (i.e., handwriting), motor coordination, and sensory processing. For many of my patients, their ability to make progress in these areas is significantly limited by neurologic and/or muscular dysfunction. This means they are unable to move efficiently, and any new skills are based on an inaccurate foundation. My job is to help these children correct existing errors and guide their acquisition of new skills through the correct stages. This is where CrossFit fits in nicely.

CrossFit's nine foundational movements provide an excellent starting point for working on body awareness, basic strength and coordination. Adding those elements into a simple and short workout improved these children's neurologic and muscular endurance, as well as provided the psychological benefits we all get from slaying our favorite WOD: confidence, persistence, a sense of accomplishment. With some small adaptations, CrossFit-style movements and programming have provided me with a valuable tool for improving the lives of children with disabilities.

The Program

My primary focus has been the squat. It is not only the first of the foundational movements, but it is also the logical starting point for teaching controlled, distinct movement. When children lack motor control and coordination, their movements are a controlled chaos. Children are labeled as clumsy, they fall easily, and they run into others without realizing it. Like a spinning top, it is easier for them to stay upright in constant motion rather than a controlled, static position. Using the squat as a starting point allows me to work first on achieving static stability in the starting position. This, in itself, is a challenge for many of these children.

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Courtesy of Josh MacDonald

The bench gives a specific reference point for finding the bottom of the squat.

Learning the squat-width stance, and holding it, requires more midline stability and body awareness than some of these children have. Once a child can hold the top and bottom positions for 3-5 seconds each, I move on to the ability to slowly lower to the bottom of a squat without collapse. To accommodate this I use a simple bench placed behind them as a target and a security against falling. Initially I allow them to actually sit on the bench to give them a more firm understanding of the bottom position. This prevents them from bottoming out and squatting too far down without stability. All of this is done with the use of "butterfly hands," as taught in the CrossFit Kids class and *CrossFit Journal*.

Once they can maintain midline stability through the lowering and standing portions of the movement, we work on a touch-and-go on the bench, then remove the bench and focus on stability through the full range. One major point of challenge is the balance and stability needed to squat with active extension of the trunk and weight on the heels. Usually a significant forward lean needs to be addressed with cues such as, "Head up," "Keep your butterflies high," or "Stay tall." This progression may take weeks of work, and it always occurs during a one-on-one therapy session. Once this process is completed, however, significant gains are usually seen in the child's overall motor skills and body awareness.

I then progress on to the front squat, then the deadlift. Each of these lifts (performed with only a PVC pipe) helps to establish a firm base of support and midline awareness. Because so many of these children have no awareness of where their bodies are, I only introduce overhead movements when they demonstrate a basic ability to maintain midline and shoulder stability.

The shoulder press is the first step toward overhead movements. When performed without weight, the press is still an effective tool for teaching these children how to use their hands overhead without collapsing at their trunk. I reserve the overhead squat for only the highest-functioning clients. This movement is very complex and requires a high level of control and body awareness. Once a child is capable of an overhead squat, he does not usually need my therapeutic services much longer.

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WODs

While I don't use benchmark Girls or Olympic lifts, I do use a variety of WODs. I focus on skills and elements that challenge the child's specific needs, but I also adjust reps, rounds and time frame to meet a child's metabolic and physical capacity. I won't begin to use a movement in a WOD until the child has demonstrated consistency with the mechanics. That may fluctuate daily, as a child may need review of a previously mastered movement if he or she is having an "off day."

Typical CrossFit scaling is used (i.e., knee push-ups or varying height of boxes for jumps), but I also use substituted items if a child cannot complete the suggested element. For example, I may replace a balance-beam walk with walking on a brightly colored line of duct tape. Or I will use a light medicine ball slam ball instead of wall-ball if the child cannot safely manage the overhead challenge. Regardless, the focus is on tailoring the workout to the child's specific needs and addressing his or her unique goals.

My WODs are usually a set number of rounds, around three or four, but I am always ready to change the parameters in the middle of a workout if the child is too challenged or if I underestimated his abilities. Because these workouts are usually set up as a game, I often tell the children we are going to work on an obstacle course without specifying rounds or time frame. It is then up to me to find the delicate balance between challenging appropriately and overstressing the child. If I do my job right, the kids usually have a blast moving quickly from one activity to the next and trying new and exciting physical challenges. For these kids, like most of us, CrossFit is hard work hidden by tons of fun.

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Sensory Processing Delay

Our brains are constantly receiving information from our bodies and the environment, then processing the data to make accurate responses and adjustments. That information comes to our brain in a variety of formats: touch, taste, smell, sight, sound, and via the proprioceptive and vestibular systems. The five major senses are fairly straightforward, but the last two, proprioceptive and vestibular, are vital to body and environmental awareness.

Proprioceptive information comes from receptors in the joints and muscles. This is the data that tells your brain where your body parts are at any given time. Vestibular information is your sense of balance. This tells you where your body is in space (i.e., upside down, on your side, bending over, etc.).

A sensory processing delay occurs if a child's body, or brain, does not correctly process all of this incoming information. Such children cannot accurately react to changes in their body or environment. They may over- or under-react to new information, looking clumsy or uncoordinated.

There are also neurologic links to emotional and regulatory centers of the brain. Without accurate, consistent information, the brain may stay either too active or underactive. In both cases, motor coordination is affected and inaccurate.

For these children, learning a complex movement like the squat or deadlift can become a very complicated process. It can become difficult for them to copy the small subtleties needed for safe, coordinated body movements. It becomes my responsibility to break down these movements into simple, distinct parts that can be more easily understood and repeated. I may need to add more physical cues (a bench to squat to), verbal cues or visual cues. Children with sensory processing delays struggle with motor coordination, but the process of learning basic, foundational movement skills can help. Not only do they learn safe and effective movements, but the process also itself carries over to improve general coordination and sensory-processing skills as well.

—Josh MacDonald

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Here are a few examples of some of my workouts:

4 rounds of:
10 push-ups
Sprint 30 feet
10 box jumps (12 inches)
Bear crawl 30 feet back

8-minute AMRAP:
5 box jumps (10 inches)
Sprint 30 feet
Agility ladder out and back
Sprint 30 feet back

3 rounds of:
Crab walk 20 feet
10 squats
10 push-ups
10 sit-ups

3 rounds of:
10 squats
Heavy bag pull hand overhand (20 feet)
Heavy bag drag over shoulder (20 feet)

This 50-lb. bag provides an external load that requires midline stability and body awareness to pull and drag.

Goals

CrossFit's focus on measurable, objective outcomes fits perfectly with the therapy setting. One of the practice guidelines for occupational therapy is the use and monitoring of short-term and long-term goals. With each patient I set initial goals based on an evaluation. Every three months, those goals are reviewed and progress identified. As the child progresses, new goals are established or goals are revised if they remain unmet. This ensures effective treatment and quantifiable progress.

Courtesy of Josh MacDonald

Through the progress seen in quarterly goals, I have been able to track the benefits of a CrossFit program with my patients. While I do work on a lot of areas beyond the CrossFit approach (i.e., self-dressing and handwriting), I have been able to track the benefit of CrossFit on both the predicted areas and some unexpected gains. For example, many of my patients develop improved coordination and awareness of their body. As mentioned earlier, these kids were clumsy and fell a lot, but a CrossFit approach helped them reach goals like: *Patient will demonstrate motor planning and body awareness sufficient for completion of a 3-step obstacle course without falls or loss of balance, 90% of trials.*

When a child is clumsy or weak, he also usually has poor metabolic conditioning. It is hard to improve respiratory or metabolic capacity when all available efforts are directed at basic coordination. Through the use of regular workouts, a commonly achieved metabolic goal is: *Patient will engage in 15 minutes of therapeutic exercise without signs or symptoms of fatigue, 90% of trials.*

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I also saw gains in some unexpected areas, like attention to task and following directions. It is common for these kids to be unable to focus on normal tasks (i.e., schoolwork) for more than two or three minutes, and they have a hard time following basic directions. The structure of typical CrossFit workout provided quite a bit of help in these areas. I start with couplets and simple rep schemes but provide lots of cues when the child's attention or memory fades. Then I progress to triplets or chipper WODs that have slightly more complicated elements, and I adjust the amount of cues to match the child's ability to remember and follow the steps of the workout. When the child is able to remember the parts of a workout, he also began to demonstrate an improvement in the ability to follow other verbal directions. After several progressions, these patients have made progress on goals like the following: *Patient will follow 2-step directions with only 2 cues, 80% of trials.*

Not only do I see improvements in physical aspects, but I also see gains in psychological, cognitive and emotional areas as well.

These children also improved in their ability to attend to focused work when finished with a small workout. Lots of research has linked exercise to cognition (*CrossFit Kids Magazine No. 38* and *No. 40*), and I began to see it happen in my clinic, too. My patients could stay on task with work at a desk or other focused tasks for much longer periods after completing a WOD. I had several children meet the following goal: *Patient will attend to seated task for 8 minutes, without additional cues, 3 out of 4 trials.*

Courtesy of Josh MacDonald

This is a 12-inch box jump and can be used for challenging the child's power and coordination while stressing the cardiorespiratory system.

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Courtesy of Josh MacDonald

An 8- or 4-lb. slam ball and hop along the dots require a lot of physical awareness as the child manages an object overhead, and it's fun for the kids to throw it as hard as they can.

The Rewards

Each of the objectives listed above are specific goals that were met with different children who were exposed to the CrossFit approach. While this was not the only method for therapy used with these children, the benefits and application of CrossFit are unmistakable. Learning new skilled movements and completing challenging workouts benefit these children in very clear and quantifiable ways. Not only do I see improvements in physical aspects, but I also see gains in psychological, cognitive and emotional areas as well.

It is incredibly rewarding to see children's excitement as they progress from a discoordinated eight-inch box jump to a 16-inch box jump at 33 percent of body height, or to watch them learn to string together three single jump ropes after three weeks of frustration and failing. What is even more gratifying, though, is when the parents tell me success stories about how their child falls less, pays more attention in class, keeps up with siblings and, in general, has more confidence and seems much happier with life.

Like most trainers, I truly love watching my clients as they grow and improve their physical skills. I have the added benefit, however, of watching the quality of life for the child and family improve dramatically as they regularly reach therapy goals. CrossFit has become a big part of making that happen with many of my patients, and I am thankful for the opportunity to use CrossFit to help these families.

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About the Author:

Josh MacDonald received his master's degree in occupational therapy in 2001 and has nine years of experience working with children with special needs in both outpatient and inpatient neuro-rehabilitation. He is the pediatric therapy manager at Arizona Orthopedic Physical Therapy—Kids Place in Goodyear, Ariz. Josh works out at CrossFit Fury, where he also runs the CrossFit Kids program. Josh is a Level 1 trainer and CrossFit Kids trainer.

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