Improving gait without making kids feel ‘broken’

Patellofemoral pain in children and teens

PLUS:
- Bilateral long-jump training
- Care for patellar dislocations
- Whole body vibration for ITW
My Allard ToeOFF makes me...

FIERCE

allard USA www.allardusa.com

ALLARD USA, INC.
300 Forge Way, Suite 3
Rockaway, NJ 07866-2056
Toll Free 888-678-6548
Fax 800-289-0809
news

5 Bilateral long-jump practice ups takeoff leg performance
  Benefits persist 3 weeks after training
  By Katie Bell

7 Surgery beats conservative care for first-time kneecap dislocations
  Less recurrence, better sports outcomes
  By Greg Gargiulo

9 Whole body vibration boosts speed, stride length in toe-walkers
  Most improvements are transient
  By Larry Hand

features

11 Improving gait without making kids feel ‘broken’
A normal gait is often the goal for children with neuromuscular disorders and mobility impairments, but research suggests this may come at the price of children’s positive self-identity. These issues are leading some practitioners toward more holistic, family-centered approaches to walking.
  By Brigid Galloway

17 Patellofemoral pain in children and teens
Pediatric patellofemoral pain hasn’t historically received much research attention. Recently some experts have said it can have a long-term negative impact. New research suggests some basic solutions to the common yet often overlooked problem that can cause kids to drop out of sports.
  By Lori Roniger

From the editor:
A new normal

When parent magazine LER first covered the idea that pushing kids with mobility impairments toward a “normal” gait—both in therapy and in their lives—could have both positive and negative consequences, I instinctively got it. (See, “The value of walking in children with CP: A matter of perception,” LER, January 2013, page 14.)
That’s because my closest friend’s 8-year-old daughter, who was adopted from China and has several physical and emotional issues, had just announced she was done with therapy and doctors forever. She said, “I know I’m broken, but I’m tired of being fixed.” She was refusing therapy for convergence insufficiency, in which the eyes don’t work together well during near vision and which can seriously impede one’s ability to read and learn.
Since first bringing her home, my friend had taken her to more than a dozen doctors and therapists, most of whom had helped her child make great strides. But the child had also absorbed a message: The things that are wrong with me are bad, and so am I.
This dynamic can leave both parents and practitioners unsure of the best way to deliver needed care, including gait therapy. Our story in this issue, “Improving gait without making kids feel ‘broken,’” page 11, provides some lower-extremity specific context and advice. One of the experts interviewed, Paul Jordan, DPM, emphasizes that he cares much less about normal gait than about kids being able to do the things they want to do.
He encourages them to try whatever activity inspires them. He notes, “They don’t care if they do an activity differently, they just want to do it.”
Last night I read about Matt Stutzman, who will soon compete in the Paralympics in Rio. Stutzman, born without arms and known as the “armless archer,” won a silver medal in the 2012 Paralympics. He aims and releases the bow in a complex series of moves involving his jaw and feet—and with incredible accuracy.
His mom noted on his web page, “Our family strategy was to allow Matt the freedom to try almost anything if he could accomplish it under his own steam.”
These are attitudes that could change the future of kids with gait impairments.
Emily Delzell, Senior Editor

Shutterstock.com #192753533
For over 25 years...
Anatomical Concepts, Inc. has committed to designing USA-manufactured custom-fit and prefabricated lower extremity orthoses for the pediatric patient that provide more consistent and cost-effective results!

Anatomical Concepts, Inc.

Industry-Leading Orthotic Devices

It’s about Patients Too! The Little

550RTBS
Pediatric RAPO™ w/ terry cloth lining

1077
Pediatric V-VAS™ custom KAFO

854
Pediatric KAFO w/ terry cloth lining

550RKG
Pediatric RAPO™ w/ kodel lining

850
Pediatric KMO™ w/ terry cloth lining

1-800-837-3888
AnatomicalConceptsInc.com
Bilateral practice should be established early in youth long-jump training programs to improve the jumping performance of their dominant takeoff leg, according to research from Karlsruhe, Germany, that may have implications for other track and field events.

“Even though the exact integration of training with the nondominant body side [order, frequency, etc] is not clarified yet, bilateral training per se seems to be relevant,” said first author Anne Focke, PhD, deputy director of the BioMotion Center at Karlsruhe Institute of Technology.

Investigators used jumping distance in a pretest to determine the participants’ dominant leg.

Investigators placed participants into two groups: a unilateral practice group that practiced the long jump using only the dominant leg for takeoff (n = 31, 16 girls) and a bilateral practice group (n = 30, 16 girls) that used both the dominant and nondominant legs alternately for takeoff. Both groups underwent 12 weeks of 1.5-hour, twice-weekly practice sessions that consisted of a specific long-jump practice and bilateral exercises for coordination, stabilization, and sprinting.

The unilateral and bilateral groups completed the same practice workload and did the same coordination, stabilization, and sprinting exercises.

In addition to the pretest, participants completed a post-test after the 12-week practice period and a retention test after three weeks without practice. Each test consisted of six long jumps, three using each leg for takeoff in a randomized order. Investigators analyzed the best jump of the three in terms of distance.

All participants improved their jumping performance from pre- to post-test and from post-test to retention test. The results also suggested a superior effect on the dominant leg’s jumping performance for bilateral practice compared with unilateral practice. The performance increase from pretest was significantly higher for the bilateral practice group’s dominant limb at both post-test (5.2%) and retention test (7.4%) compared with 3.4% and 4.5%, respectively, for the unilateral practice group.

The jumping performance of the dominant leg from post-test to retention test also increased more in the bilateral training group than the unilateral group, but to a lesser degree in both groups compared with the change in performance from pre- to post-test. Performance of the nondominant leg was significantly higher from pre- to post-test and post-test to retention test in the bilateral training group, but not in the unilateral training group.

Bilateral practice for unilaterally performed sports like the long jump should become normal practice,” — Anne Focke, PhD

By Katie Bell

Bilateral long-jump practice ups takeoff leg performance

Benefits persist 3 weeks after training

By Katie Bell

The European Journal of Sport Science epublished the findings in February.

Commenting on the study, Brian Mackenzie, BAppHons, a Level 4 Performance Coach (Sprints & Combined Events) and coach tutor/assessor in Birmingham for British Athletics, the UK’s National governing body for track and field athletics, agreed with the authors’ conclusion that bilateral practice should be established early in long jump training to improve the performance of the athlete’s dominant leg.

Mackenzie added, “For maximum muscle force development, use bilateral training. When maximum force is not a priority, unilateral exercises can work well to correct asymmetry.”

Discussing exercises that are specific to jumping practice in youths and adolescents, Mackenzie said, “As their joints and tendons have not fully formed, I focus on the general skill of jumping for height [high jump and distance long jump] with learning to jump with left- and right-foot takeoff—the focus is more with technique in the run up, takeoff, flight, and landing phases.”

Katie Bell is a freelance writer based in New York City.

As a clinician, I find working with Cascade and fitting your DAFOs make my ability to practice a pleasure.

– Moss H., CPO

Discover the DAFO® Experience

Diverse bracing solutions for your patient’s unique needs—comfortable realignment and dynamic, flexible support.

Stop by and see what’s new | AOPA Booth #1323

cascadedafo.com

Helping Kids lead healthier, happier lives.
Surgery beats conservative care for first-time kneecap dislocations

Less recurrence, better sports outcomes

By Greg Gargiulo

Adolescent patients with first-time acute patellar dislocations treated surgically have a lower risk for recurrent dislocation and higher knee-related quality of life and sports-related outcomes compared with those managed conservatively, according to a recent review and meta-analysis from the Hospital for Special Surgery (HSS) in New York City.

“Our review was focused on first-time patella dislocators, which is a more controversial area than recurrent or chronic cases,” said first author Benedict Nwachukwu, MD, an orthopedic surgery resident at HSS. “We believe our findings suggest surgery may be able to better restore patients to preinjury level of function than conservative care.”

Nwachukwu and colleagues included 11 studies that provided data on 627 injured knees: 470 were managed conservatively (mean age of patients, 17 years) and 157 were treated surgically (mean age, 16.1 years). The overall quality of the studies analyzed was variable, with only two using a randomized controlled trial design.

Of the conservatively managed knees, 136 (30.9%) sustained a repeat dislocation, while 35 (22.3%) of those treated surgically experienced another dislocation. Both conservative and surgical treatments were associated with good functional outcomes. Surgery, however, was associated with significantly higher Knee Osteoarthritis Outcomes Scores (KOOS) for knee-related quality of life, daily function, and sports and recreation compared with conservative care. The most commonly used surgical procedure is medial patellofemoral ligament reconstruction.

Knee Surgery, Sports Traumatology, Arthroscopy published the findings in March 2016.

“The current controversy is mainly among surgeons, to whom these patients present,” Nwachukwu said. “Surgery is associated with a decreased risk of recurrent dislocation, but, because it’s an invasive procedure, it can be challenging to decide when it is most appropriate.”

In addition to the primary outcomes, the current study also identified trochlear dysplasia and skeletal immaturity as predictive risk factors for repeat dislocation in both conservatively and surgically treated patients. Although little attention is currently paid to these characteristics, the results encourage more consideration of them when making treatment decisions, experts say.

However, the quality of featured studies urges caution.

“This is a well-performed meta-analysis, but it is limited by the quality of the data in the included studies,” said Laurel Blakemore, MD, associate professor and chief of the Division of Pediatric Orthopaedics at the University of Florida College of Medicine in Gainesville. “The study does suggest there may be an indication to consider earlier surgical treatment in the highly active pediatric athlete based on measurable benefits in return to sport and quality of life, but the authors correctly point out the need for a prospective randomized study on this subject.”

Nwachukwu acknowledged this, as well: “Based on the limitations of the data, our study is one data point that should be considered with prior studies and future studies when making a clinical decision on pediatric patients with this injury,” he said.

Finally, Blakemore pointed out why it’s important to make a distinction based on patients’ activity level: “For less active individuals, the benefits of early surgery may not be as clear, and in those patients in particular, I believe a trial of conservative treatment is still appropriate,” she said.

Nwachukwu and his coauthors intend to continue exploring this topic by further analyzing whether highly functioning athletes benefit more in terms of quality of life and other areas from surgery than conservative care. They also plan to establish a prospective registry for patellar dislocation in which they can follow patients regardless of their treatment and track their outcomes in a longitudinal fashion.

Greg Gargiulo is a freelance medical writer based in San Francisco.

Sources:
embracing clubfoot around the world

Product List

- Preemie AFO Pair and Bar
- Ponseti® AFO Pair, sizes 0000-12
- Ponseti® AFO Pair, sizes 0000-6
- Ponseti® AFO Pair with Toe Stilt, sizes 2-11
- Ponseti® AFO/PFS Pair, sizes 00-12
- Ponseti® AFO/PFS Pair with Toe Stilt, sz 2-11
- Ponseti® Extra Short Bar
- Ponseti® Short Bar
- Ponseti® Long Bar
- Bar Hardware Kit
- Pressure Saddle, small
- Pressure Saddle, large
- AFO Socks, 3 pack
- Dorsi Ramp
- The Parent’s Guide to Clubfoot
- My Clever Night-Night Shoes
- Ponseti® Clubfoot Model
- Cast Application Rubber Legs and Stands
- Five Stage Cast Model
- Tenotomy Model

Find out more about Ponseti® Clubfoot Products by visiting www.mdorthopaedics.com or calling toll-free 877-766-7384
Whole body vibration boosts speed, stride length in toe-walkers
Most improvements are transient

By Larry Hand

The findings of a recent Australian study add to early evidence in support of whole body vibration (WBV) as a potentially simple, non-invasive treatment for children with idiopathic toe walking (ITW), with mechanisms still to be worked out.

The study, e-published on April 12 by the Journal of Child Neurology (JCN), found WBV has positive effects on gait in children with ITW though some of those effects were only seen immediately after treatment.

“This was an exploratory study,” said Cylie M. Williams, PhD, adjunct research fellow in the School of Physiotherapy at Monash University in Victoria. “We wanted to gather evidence prior to setting out to look at it in a larger trial.”

Williams and colleagues assessed the impact of multiple doses of WBV on number of heel strikes as a percentage of total steps, spatial and temporal gait parameters, and ankle range of motion for 15 children (five girls, mean age 5.93 years, mean height 120.3 cm). They applied WBV for five sets of one-minute vibration followed by one minute of rest, as the children stood upright in a semisquat position with their feet flat on the vibration platform. Gait was assessed at baseline and at one, five, 10, and 20 minutes postintervention; ankle range of motion (ROM) was assessed at baseline, immediately postintervention, and 20 minutes postintervention.

The researchers found immediate, statistically significant increases in left and right stride lengths and velocity, all of which were sustained at 20 minutes. Immediate, significant increases in number of heel strikes and ankle ROM were not sustained at 20 minutes. WBV may improve gait via the rapid ankle ROM increase or a response to neuromodulation, the authors wrote.

The results are encouraging enough to continue this line of research, Williams said, though they contrast with the findings of a 2015 study from Georgia State University in Atlanta, also published in JCN. In the US study, which involved a single one-minute dose of WBV at a higher frequency, no significant effect on gait was observed in 15 children with ITW. (See “Toe-walking re-searchers revisit idiopathic label,” LER: Pediatrics November 2014, page 15.)

The inconsistencies underscore the relative infancy of ITW research into WBV, Williams said.

“I don’t think our understanding of vibration perception and how that may be impacted by physiological changes in the muscle is sophisticated enough to make assumptions on if children have different responses to WBV,” she said. “Particularly not yet in children, and definitely not in children who are idiopathic toe walkers.”

The timing of post-WBV assessment may make a difference, said Mark Geil, PhD, director of the Center for Pediatric Locomotion Sciences at Georgia State University, and coauthor of the previous research paper.

“When we first explored the idea of WBV in children with ITW, we were cautioned by several clinicians that it has a ‘short half-life.’ Consequently, I’m glad that Williams et al conducted a series of measurements over time following the WBV intervention to compare immediate effects to short-term effects,” Geil said.

The baseline visual perception threshold may be a key to further understanding, according to Geil, who noted this is another example of how his group’s findings have contrasted with those of Williams and colleagues. In a 2012 study, the Australians reported that children with ITW were hypersensitive to vibration relative to typically developing children, but the Americans were unable to replicate the results in their 2015 JCN study despite using similar methods.

“With more research, and as technology changes and becomes more accessible, this may become an easy home treatment option.”

Larry Hand is a writer in Massachusetts.

Sources:
Know Better Orthoses™

KEY BENEFITS

- Proprietary heat adjustable plastic makes patient management much easier vs. traditional orthoses
- New treatment options for patients historically not candidates for orthotic intervention & management
- Fuzion’s compression design holds the patient in a secure comfortable position while assisting with spasticity management
- Makes cleaning and adjustments easy
- Accommodates volume changes
- Available for both pediatric and adult patients

Remember the 5 Cs
- Custom
- Comfort
- Control
- Compression
- Compliance

Fuzion Resources Available Online at www.orthomerica.com/fuzion

ORTHOMERICA
877-737-8444 | www.orthomerica.com
Improving gait without making kids feel ‘broken’

A normal gait is often the goal for children with neuromuscular disorders and mobility impairments, but research suggests this may come at the price of children’s positive self-identity. These issues are leading some practitioners toward more holistic, family-centered approaches to walking.

By Brigid Galloway

As an occupational therapist in children’s rehabilitation for more than 20 years, Gail Teachman, PhD, observed a troubling phenomenon: Parents of children with mobility issues, including those caused by cerebral palsy (CP) and degenerative neuromuscular disorders, often passed along the messages embedded in children’s rehabilitation that suggest their kids were somehow defective and in need of “fixing.” It wasn’t intentional. The parents were worried about their children’s long-term happiness. Yet, the desire for their child to meet age-appropriate mobility milestones, or to walk with a “normal” gait, created mixed effects—some harmful.

“That’s the heartbreaking part for these families. Social expectations reinforce the message that something is wrong with their child, and that as a ‘good’ parent they should try everything possible to fix their child,” said Teachman, a Canadian Institute of Health Research postdoctoral fellow for Views on Interdisciplinary Childhood Ethics at McGill University in Montréal.

“A top goal is for their child to walk, regardless of the cost, or the burden that places on their family or on the child. After all, the notion of ‘overcoming’ disability is reinforced over and over in popular culture,” she said.

That burden can have lasting effects on the child. As Teachman followed up with the children she worked with at Holland Bloorview Kids Rehabilitation Hospital in Toronto, Canada, she saw their attitudes develop in the context of the reality of their everyday lives.

In a 2012 study published in Physiotherapy Theory and Practice, Teachman and lead researcher, Barbara E. Gibson, PhD, examined the symbolic value of walking.¹ (Gibson has also written about this topic for LER. See “The value of walking in children with CP: A matter of perception,” January 2013, page 14.)

Participants included six Canadian children with CP, aged 9 to 18 years, with gross a motor functional classification system (GMFCS) level of III or IV. They interviewed the children and one of each child’s parents (five mothers, one father). The children’s
accounts revealed how, over time, and with continued exposure to negative values, they came to look at themselves as a burden to society.

Teachman contends the high value placed on walking is related to expectations about what is considered normal childhood activity. Even when children with mobility issues are physically included in mainstream activities, they may still experience exclusionary and even hostile social interactions.

“Disability is almost universally assigned a negative value,” Teachman said. “These assumptions are deeply imbedded in all of us. When children are repeatedly exposed to the sense that being disabled is a negative thing, they internalize the sense of ‘I’m lesser, broken, or there’s something wrong with me,’ because they are not able to do things in the same way that so-called typically developing children do.”

According to the study, the children were more likely to be accepting or even excited about the alternate modes of mobility that marked them as “disabled” than their parents. Likewise, children “conveyed much more ambivalent beliefs about the value of walking than their parents.” Some parents were able to counter society’s idealization of normal by shifting their own perspectives; for example, coming to perceive their child’s mobility challenges as normal for that child, and then passing this attitude along to their child and others who interacted with their child.

Teachman said healthcare providers can play a role in relieving the stigma attached to a child’s disability by encouraging children and parents to talk about difficult subjects, such as how the family feels about the child using a wheelchair or alternative ways of being mobile, such as crawling.

“Clinicians can discuss these kinds of values and point out how they can shift,” Teachman said. “You can support young people and their families to develop more positive disability identities.”

**Communication gap**

Collaboration between clinicians and parents, who have knowledge and understanding of their child, may be key to changing the value system around the goal of attaining normal gait and helping kids with mobility challenges achieve as much function as possible.

A 2012 scoping review in *BMC Pediatrics* explored parents’ actions, challenges, and needs as they related to enabling their children’s participation in daily life.

The authors identified 14 studies of 146 Dutch parents of a child aged 4 to 12 years with a neurological nonprogressive physical disability that focused on the actions, challenges, and needs of the parents.
“We discovered a distinction between parental priorities and those of therapists treating the children,” said first author Barbara Piškur, PhD, senior researcher at the Centre of Research Autonomy and Participation for Persons with a Chronic Illness & Department of Occupational Therapy at Zuyd University, Heerlen, the Netherlands.

“We saw a pattern that the parents are alert and occupied with their [child’s] environments [social, home, school, rehabilitation, etc],” Piškur said. “They described that [healthcare] professionals lacked knowledge or understanding about what their children need to participate.”

Parents perceived a gap in understanding between the environments where their children lived and the environments in which practitioners examined or worked with their children. “I strongly believe [practitioners] working with children with mobility disorders need to collaborate with parents intensively to understand the real participation problems of the child, to set up goals together with the child, and to use the expert knowledge of parents,” said Piškur.

Piškur and colleagues found healthcare professionals rarely provided information about suitable leisure activities. Moreover, parents stressed that, often, clinicians regarded leisure activities as additional therapy rather than something children do with other children for fun.3

“The therapists were focused on the functioning of a child as a person, but the parents were far more focused on how the child participates in different activities in different contexts,” Piškur said. “The parents were keenly aware that, even if he may walk well, if he’s isolated and lonely and doesn’t have friends, that will have a big impact on the child and his future.”

Piškur believes more collaboration between practitioners and parents is required, as is more focus on the demands of specific environmental settings. She recommends therapists seek more exposure to the child’s home and school environments so they can match techniques and advice with those contexts. By experiencing the challenges the child faces, practitioners could tailor therapy to his or her actual needs.

Teachman agreed clinicians often have a different idea of “success” than parents. According to a 2014 article published in Physical & Occupational Therapy in Pediatrics,3 parents of children with CP were often more concerned with the goal of independent walking than other goals, while therapists “believed walking was important, regardless of its appearance or what gait aids were used because it increased accessibility.”

Creating positive disability identities is a key goal—for parents, clinicians, and their young patients. It’s an especially delicate balance for clinicians to manage realistic expectations alongside parents’ hopes.

Continued on page 14
One method Teachman has found effective is to facilitate children’s relationships with other children who have similar mobility or functional issues.

“I’ve worked with young people who have never met anyone else who was encountering some of the same physical challenges they experience,” Teachman said. “Meeting other people who use the same mobility or assistive devices can be quite powerful; older youths can mentor younger kids, and this can contribute to a positive sense of their own worth.”

Follow the leader

Paul Jordan, DPM, has a handle on both optimism and expectations. For the past 37-plus years in Long Island, NY, he’s specialized in pediatric biomechanics, orthoses, and surgery for children with neuromuscular and neuromotor disorders. He refuses to make predictions about mobility based on an infant’s magnetic resonance imaging (MRI) results or initial examination.

“An MRI says nothing about the child’s ability and will, and the parents and their approach,” he said. “The parents have so much to do with it. If the parents hear their child is never going to walk when it’s first born, where are they going to set their sights? I tell parents to set their goals high, and if we make it fifty percent of the way, wonderful. My guess is, we’ll make it further.”

Jordan’s goal is not whether a child will walk “normally,” but rather that he or she will be able to do the things they would like to do. He spends 90 minutes or more with every child, watching them play and observing their movement and interaction with the environment, and involving siblings when possible.

He advocates listening to children to find out what’s most important to them. “The kids teach me,” he said. “They don’t care if they do an activity differently, they just want to do it. As they get older, you empower the kids to make choices.”

Jordan builds custom orthoses to accommodate the comfort level and specific activities in which a child wants to participate. For example, after performing surgery on a young patient with spastic diplegia that enabled him to walk for the first time, Jordan removed his casts and fit him in ankle foot orthoses to help him ambulate.

“After a year, he came back for a new set of braces,” said Jordan. “I said, ‘I don’t want to put you in them. You’re eleven and half years old and don’t need them now.’ He said, ‘I can walk farther distances and they help me play baseball.’ So I let him choose. We keep changing the design and shape of them to suit his function and needs.”

Jordan frequently consults with neurosurgeons, pediatric orthopedists, and therapists, sharing his understanding of each child’s needs. “Together, by being more creative and open-minded, we can see the child from a different perspective,” he said. “All kids dream, and my goal is to see how I can help them make some of those dreams come true.”

Jordan tries to dispel the naysayers—including other healthcare professionals and parents—who may have told the child they can’t do the activities they long to perform. “I say, why not? I introduce them to ways they can learn to surf, sail, or skateboard—and they do can it—but they do it differently,” he said. “They don’t care if they do it differently, they just want to do participate.”

Sometimes adaptive equipment is required, but Jordan encourages children to participate by exploiting their abilities rather than focusing on their perceived disabilities. Either way, his goal is for them to participate with kids of the same age who don’t have mobility impairments.

No expectations

For some, allowing a young patient to lead the approach to treatment based on their real-world needs and environment can produce impressive results. Krishna Kalmese, BS, kinesiologist and owner of Kalmese Wellness Studio in Bourbonnais, IL, uses this technique as he works with children with disabilities, including those who have mobility issues caused by CP, multiple sclerosis, and other neuromuscular conditions. His approach is one of patience and gradual progress based on the individual, rather than time-driven expectations.

He noted that, parents who set a specific time frame for therapeutic goals hinder their child’s progress. “Our society introduces speed into goals,” he said. “I’ve had young people who could have done great things quit therapy because their parents thought they should be progressing further, faster.”

Kalmese begins each session by checking in with his young clients to see how they’re doing physically and emotionally. Taking their lead, he selects exercises that best fit their ability at that time. “I encourage them frequently,” he said. “For example, floor exercises open their hips, and balance work helps build confidence. The approach is always to remain positive, and I try to avoid stress and discomfort so they want to keep coming back.”

One of Kalmese’s longtime clients, Kiley Lyall, was born with epilepsy and diagnosed with CP (GMFCS level II) and autism when
she was aged 3 years, the same time she finally began to walk. Even then, she frequently lost her balance. Her mother, Kathleen Lyall, was told by clinicians that her daughter’s physical, emotional, and mental abilities would never advance beyond that of a typical 8-year-old. Today, Kiley, aged 24 years and living in a Chicago suburb, runs conventional marathons alongside normally abled athletes.

“No one told her ‘You’re going to love working out,’” Kalmese said. “It was an aha! moment. She developed it on her own. You could see how she started to open up and become herself.”

Kiley’s combination of conditions made balance, let alone walking, difficult. But, after winning a Special Olympics relay when she was aged 8 years, she embraced distance running. In addition to Kalmese’s fitness and nutritional guidance, Kiley began ongoing physical therapy with a running coach. Her mother soon discovered that running helped improve her daughter’s balance and boosted her confidence. When Kiley ran, she no longer felt different or left out. She was just another runner in the pack.

“It was hard when she was little,” Kathleen Lyall said. “It’s not an easy road, but if you listen to your child—and that’s the key—they will lead you into the right direction.”

With Kalmese’s help, the Lyalls found ways to follow Kiley’s lead and encourage her activity. By listening to their daughter and helping her define her own goals, she exceeded all expectations. Kiley now works part time at a hair salon. When she showed talent in photography, Kathleen helped her launch a portrait business.

“No in a million years did we think that Kiley would be doing the things she does today,” Lyall said. “When we have unrealistic expectations of our children and we push them, it’s not going to work. If they love to do it, they will succeed at it, whether they are specially challenged or not.”

Today, Kiley (who aspires to become a personal trainer) continues to push herself to do more in the gym, and encourages other people—with and without disabilities—to reach their goals. In January, she appeared on the cover of Women’s Running after being selected from more than 4000 entries in its annual Cover Runner contest. But, even when the attention is positive, Kiley sometimes struggles with being singled out.

“Kiley has a distinctive gait, so when she runs races sometimes people come up and encourage her,” said Lyall. “She just wants to be treated like everyone else and be accepted for what she can do because of who she is, not because she has a disability.”

Brigid Galloway is a freelance writer in Birmingham, AL.

References are available at lerpediatrics.com.
The Indy 2 Stage
An orthosis within an orthosis

The perfect bracing option for children as they transition through their stages of upright gross motor skill development. The two in one design securely locks the dynamic Surestep SMO system into the frame of an articulated or solid AFO. The device smoothly transforms into the appropriate orthosis based on the child’s needs at any given moment. Children can work through a variety of transitional skills without impeding normal muscle function.

Visit surestep.net for more info or give us a call 877.462.0711

grow with us

Back to School
with Surestep Shoes!

Surestep Athletic Shoes are the perfect footwear solution for your kiddos heading back to school this fall. Surestep shoes have been designed to comfortably accommodate orthotic devices.

- Flexible sole to allow intrinsic movement
- Two removable insoles for the perfect fit
  - Highly durable material
- Sole designed for custom modification
- Available in white with blue or pink trim or all black

Order your pair today at surestepshop.com

877.462.0711 | surestep.net
The high prevalence among young athletes suggests highly repetitive and/or excessive and specific loading contributes to the pathogenesis of patellofemoral pain.

Pediatric patellofemoral pain hasn’t historically received much research attention. Recently some experts have said it can have a long-term negative impact. New research suggests some basic solutions to the common yet often overlooked problem that can cause kids to drop out of sports.

By Lori Roniger

Symptoms of patellofemoral pain (PFP) are similar among patients of all ages, but contributing factors differ between adults and kids, suggesting a need for different treatment and prevention strategies. Michael Rathleff, PT, PhD, senior researcher at the Research Unit for General Practice in Aalborg, Denmark, is the most prolific researcher in this area. He was motivated to study PFP in children and adolescents at the suggestion of a mentor, who was an orthopedic surgeon.

“He inspired me to look into this because he felt it was really underappreciated and under-researched,” Rathleff said, noting less than 5% the PFP literature has focused on adolescents. “I would like to inspire more people to do the same.” He also recalled that a physical education teacher contacted him about eight years ago about the prevalence of knee pain among kids, thinking it might be only in their heads or that they were making it up.

“Our research clearly demonstrated that was absolutely wrong,” Rathleff said.

In 2011, Rathleff and colleagues administered an online questionnaire to 2200 adolescents and found about one-fourth reported knee pain; of the total group, about 7% were diagnosed with PFP. More than half (56%) of those with knee pain at baseline continued to report it two years later; those diagnosed with PFP were more likely to still have it—and were more likely to have reduced or stopped sports participation—than those with other types of knee pain. The findings, published this year in the American Journal of Sports Medicine (AJSM), suggest knee pain and PFP in particular may not be self-limiting in this population.

“We think it is one of the most common knee conditions in adolescents and adults,” Rathleff said.

Similarly, the results of a paper published in The Knee this year call into question the traditional belief that adolescent anterior knee pain is benign. The authors found adults with symptomatic patellofemoral osteoarthritis (OA) were 7.5 times more likely to report having had anterior knee pain as adolescents than those with tibiofemoral OA.
Reg Myer, PhD, associate professor of pediatrics and director of research for the Human Performance Laboratory at Cincinnati Children’s Hospital Medical Center, and his colleagues are working on creating a risk profile for young athletes who develop PFP.

“What we’re trying to do is move beyond just one predictive factor,” Myer said. “We think many things contribute to patellofemoral pain in the younger athlete.”

Much of his previous research has focused on the biomechanics of knee injuries, including anterior cruciate ligament (ACL) injury. “It’s a natural evolution to look at this,” he said.

Myer and his colleagues are following more than 700 female athletes, who play basketball, volleyball, and soccer in middle school and high school, to see if the PFP risk profiles of children change as they mature.

A study by Myer and colleagues published in the British Journal of Sports Medicine (BJSM) in 2015 found high knee abduction moments are a risk factor for developing both PFP and anterior cruciate ligament (ACL) injury in adolescent female athletes, suggesting young girls with PFP may be at risk for future ACL injury. In one cohort of girls with a mean age of 13.3 years, those with a knee abduction load greater than 15 Nm during landing were more likely to develop PFP than those below the threshold; in a separate cohort of girls with a mean age of 16.1 years, a cutoff of 25 Nm of knee abduction load during landing was associated with increased risk of both PFP and ACL injury.

Rathleff, however, said his data do not indicate that adolescents with PFP get ACL injuries. “The adolescents with longstanding PFP drop out of their sports,” he said.

Myer and colleagues have also found that athletes who specialize in one sport have a higher risk of anterior knee pain disorders, including PFP, than multisport athletes. This may be because focusing on a single sport doesn’t allow for the development of as diverse and broad a range of neuromuscular patterns, Myer said.

Christian Barton, PhD, BPhysio(Hons), an expert on PFP and a researcher at La Trobe University in Melbourne, Australia, said he sometimes sees adolescents in the clinic with PFP who are playing three different sports at the same time. They may be participating in as many as nine high-level sports sessions a week.

“As children and adolescents grow, their muscular strength development often lags behind their skeletal growth,” said Curtis VandenBerg, MD, an assistant professor and pediatric orthopedic surgeon with a focus on sports medicine at Children’s Hospital Los Angeles. “Since muscle weakness and imbalance can be an underlying risk factor for the development of patellofemoral pain syndrome, growth can increase a child’s or adolescent’s risk for developing this pain.”

Myer and his colleagues have also looked into the issue of hip strength in PFP. Although studies of adults have found PFP is associated with hip muscle weakness, their study of 329 adolescent female athletes published last year in the AJSM found greater hip adduction strength in those who developed PFP than those who didn’t. They theorized that the strength may be due to increased hip adduction on landing, and that PFP results when this compensatory balance fails.

“Who gets it?”

In Rathleff’s study, two-thirds of adolescents with PFP were highly active and played sports, on average, five times a week. However, the remaining third did not engage in any sports, challenging the notion that PFP is always a load-dependent condition associated with sports.

The high prevalence among athletes “suggests that highly repetitive and/or excessive and specific loading contributes to the pathogenesis of PFP in adolescents,” he wrote recently in an editorial in the British Journal of Sports Medicine. This includes a 16% prevalence in female adolescent basketball players, reported in 2010 by researchers from Cincinnati Children’s Hospital Medical Center in Ohio.

Continued from page 17
Isn’t all patellofemoral pain the same?

Rathleff’s research suggests that, while PFP may present in a similar way in adolescents and adults, it may not be due to the same underlying issues and may require different treatments.

Success rates for PFP treatments appear to differ between adolescents and adults, even with similar exercise treatments and compliance, he and colleagues wrote in an opinion article published in *Sports Medicine* last year. His research has also found adolescents with PFP had symptoms lasting more than three years, which is longer than found in adults. In studies of adults with PFP, long symptom duration has been associated with poorer outcomes after treatment.

“It is tempting to speculate that one of the reasons for adolescent outcomes to be lower than adults is that adults have learned to avoid physical activity that aggravates their pain, whereas adolescents have not,” Rathleff and colleagues wrote in *Sports Medicine*.

VandenBerg concurs that different mechanisms may be at work in pediatric and adult patients. “Children do not tend to have cartilage changes or chondromalacia in the patellofemoral joint, as adults commonly do,” he said.

Pain, pain go away

Experts’ views on the cause of PFP tend to guide how they think it’s best treated.

“We spend way too much time on exercise in adolescents,” said Rathleff, who sees PFP as less about muscle strength and more about load versus capacity. “I think we should spend much more time on patient education.”

He recommends providing education to adolescent patients and their parents about self-management rather than simply focusing on exercises. A study Rathleff recently completed, which enrolled 150 children aged 10 to 14 years, was based on just this hypothesis. (Results are unpublished.)

Rathleff and Barton have created an educational booklet for patients with PFP and would like to produce one for adolescents, which Rathleff said would focus more on load progression and management and less on strength.

His group has found some benefit of exercise in adolescents with PFP. In a 2015 *BJSM* study, adolescents with PFP randomized to patient education and exercise therapy were more likely to have recovered at three months and even more so at two years (44%) than those who received patient education alone (22%).

But, they’ve also found plenty of room for improvement when it comes to adherence to exercise treatments for PFP in adolescents. Lately, they have been using a sensor that allows them to capture data about time under tension, repetitions, and sets of elasticized-band exercises performed at home. The results of one study on adolescents with PFP indicate that only 15% of the total exercise dosage prescribed is being done.

One way to address this might be to let adolescents choose which exercises they prefer from among a few, Rathleff said. But better education should also help, he said.

“I do think once you’ve got the whole education side of things in place and load management, then you would do hip and knee exercises, just as in adults. But we know that compliance might be a really big obstacle to creating adherence,” Rathleff said.

Barton is employing some educational strategies clinically, for example in kids who develop PFP after they’ve increased their activity levels, such as by adding a third sport. He will talk with the patient and parents, suggesting cutting back regular activity to maybe half or two-thirds. In some cases, they build back up from walking with minimal pain to being able to handle stairs and later jogging and returning to training and competition.

Taping to offload the joint and the use of temporary prefabricated foot orthoses can also be helpful in some cases, Barton said. Those as young as 10 years typically won’t need a lot of strength work, while a few hip exercises could be helpful, he said. Older adolescents may have strength deficits that require work, though it’s necessary to make sure exercise doesn’t exacerbate their knee pain.

The motion analysis laboratory at Children’s Hospital Los Angeles allows VandenBerg and his colleagues to assess patients with PFP and to tailor a physical therapy plan for them. Additionally, they have been gathering data on control patients they hope to use for comparison to better understand the factors that may contribute to PFP.

VandenBerg recommends a targeted strengthening and stretching program similar to those that have been studied in adults, working with a physical therapist if possible, or teaching patients a few exercises to do at home.

Training to prevent pain

To prevent PFP, Myer suggests gluteus maximus and hamstrings training to help develop strength and control. These can include deep knee flexion, Russian hamstring curl, glute-ham bridge, and single-leg Romanian deadlift. Exercises can be effective in kids as young as 5 years, if they are able to understand instructions and perform movements as prescribed, he said.

He also suggests strategies to keep things fun for kids. His research group will be examining the use of augmented reality and biofeedback for neuromuscular training.

Darin Padua, ATC, PhD, professor and chair of the Department of Exercise and Sport Science at the University of North Carolina at Chapel Hill, suggests breaking an exercise program into smaller parts, such as three five-minute chunks throughout a session. Internal cues also are helpful for kids, such as telling them to bend their knees, whereas the instruction to land softly can work better for adults. Foot orthoses, taping, and bracing can also be helpful in children and adolescents with PFP, he said.

Rathleff would like to provide some education for sports coaches, noting that musculoskeletal complaints start at around age 10 years. And, he would like to see physical education classes incorporate injury prevention programs that include games and work to improve coordination, balance, and strength, similar to the FIFA 11+ program.

But, one reason for the relatively high prevalence of PFP in adolescents could be because so many schools have deprioritized physical education, Padua said.

“Now all of these fundamental motor development skills are no longer being taught,” he said.

Myer agreed.

“We should all be doing these types of exercises,” he said. “Schools keep cutting physical education, and we need to be adding more.”

Lori Roniger is a freelance writer based in San Francisco, CA.

References are available at lerpediatrics.com.
PROTOKINETICS
Leading Innovation in Gait & Balance Measurement

The Most Popular “gait mat” Technology In the World!

Best In Class Product Knowledge Combined with Amazing Customer Service

PKMAS/Zeno
The Gait & Balance Performance Solution

info@protokinetiics.com
610.449.4879
www.protokinetiics.com
facebook.com/protokinetiics