IMBALANCE AND DIZZINESS IN CHILDREN

Key points

- Most problems with imbalance and dizziness in children are temporary and easy to treat.
- Dizziness and imbalance problems may be hard to spot in children.
- Younger children may not have the words to describe what they are feeling.
- Check in with your child’s doctor if you notice a regular pattern of dizziness and or imbalance.
- Many children with vestibular disorders face developmental and learning challenges.

What is imbalance and dizziness in children?

Most problems with unsteadiness and dizziness in children are temporary and easy to treat. Unfortunately, they are often overlooked, untreated or misdiagnosed. To rule out the possibility of a more serious condition, it is important to take your child to the doctor if they have repeated signs of dizziness or imbalance.

Vestibular disorders are quite common in children. About 1 in 20 children between the ages of 3 and 17 may be affected. Girls are slightly more affected than boys. Dizziness is more common in older children and teens.

Causes of dizziness and imbalance in children

Common causes of short-lived dizziness and imbalance include:

- reduced blood flow to the brain for a short time, brought on by common events such as standing up suddenly (orthostatic hypotension) or standing still for a long time
- not drinking enough fluid (dehydration)
- increased sweating, for example on a hot day or playing sports
- skipping a meal
- viral illnesses
- fever
- side effects of some medications

Causes of dizziness and imbalance that may be longer lasting or more serious include:

- vestibular toxicity (damage to the inner ear caused by some medications or substances)
- motion sickness or cyber-sickness
- vestibular disorders such as semicircular canal dehiscence (SCD), enlarged vestibular aqueduct (EVA)
- malformations of parts of the inner ear
- migraine including benign paroxysmal torticollis and benign paroxysmal vertigo
- chronic middle ear infections
- issues related to sensorineural hearing loss
- injury to the brain (including concussion), neck or spine
- vision abnormalities
- infections, disorders or disease of the central nervous system (brain and spinal cord) such as meningitis, encephalitis, movement disorders, and dysautonomia
- seizure disorders such as epilepsy
- juvenile arthritis
- endocrine/metabolic disorders such as diabetes and underactive thyroid (hypothyroidism)
- some genetic disorders
- blood diseases such as leukemia and anemia
- motor and developmental delays
- infections or disease of the central nervous system (brain and spinal cord)
- stroke
- behavioural or psychogenic conditions
- late prematurity (babies born between 34 and 36 full weeks of pregnancy are considered
“late preterm”)

Risk factors connected with dizziness and balance problems include:
- impairments that limit a child’s ability to crawl, walk, run or play
- frequent headaches or migraines
- certain developmental delays
- a history of seizures in the past 12 months
- stuttering or stammering
- anemia during the past 12 months

Children with a family history of hearing or vestibular problems, dizziness, or motion sickness are more likely to have a balance disorder.

Symptoms of dizziness and imbalance in children

Some signs or symptoms of dizziness and balance disorders in children overlap with those of adults. Others are different.

Signs of balance and dizziness disorders in children include:
- delayed developmental milestones and learning problems
- frequent absences from school and/or struggling with writing, reading and math
- difficulty remembering things, concentrating, paying attention and following directions
- confusion, disorientation, fear, anxiety and/or panic
- fussiness, irritability, crying and/or frustration
- depression
- (spinning sensation), often accompanied by nystagmus (uncontrollable eye movement), loss of appetite, nausea, vomiting, abdominal pain and/or headaches
- dizziness (feeling light-headed, woozy or about to faint)
- difficult seeing clearly while moving the head – images may seem to bounce or blur (oscillopsia)
- awkward movements, clumsiness, unsteadiness or frequent falls
- preferring to keep feet on the ground, for example not wanting to jump or use playground equipment
- frequent car or other motion sickness
- dizziness when playing a video game or scrolling on a computer
- discomfort with sun glare or lights (especially fluorescent, blinking or moving lights)
- dislike of being in crowded areas such as shopping malls
- nausea when looking at patterned carpets or stripes
- difficulty with sports and physical activities including catching or kicking a ball, swimming or riding a bicycle

Although dizziness and clumsiness are common signs of a balance disorder, on their own they are not necessarily worrisome. For example, it is perfectly normal when:
- children feel light-headed if they are overheated, dehydrated or stand up too fast
- toddlers fall down more than a few times as they master walking
- children are dizzy as a side effect of a minor condition such as sinus congestion with a cold.

If you start to notice a regular pattern of balance-related signs, however, it is a good idea to check in with your child’s doctor.

Diagnosis of balance and dizziness disorders in children

Balance and dizziness disorders in children can be hard to recognize and diagnose. A key reason is children may not have the words to describe what they are feeling. In the meantime, you may think your child is clumsy, uncoordinated, lazy, or simply not paying attention. Your child may first be diagnosed with behavioural or learning problems. Your child’s family doctor or pediatrician can sort out if your child is feeling light-headed or faint rather than having true vertigo (spinning sensation).

Vertigo (spinning sensation) usually suggests a problem with the vestibular system. Vestibular disorders in children are often diagnosed by a specialist such as an audiologist, otolaryngologist, (an ear, nose and throat or ENT doctor) or neurologist.

The main difference between how children and adults are diagnosed is that a caregiver must be
relied on to give the medical history. The doctor will ask you questions about when your child’s symptoms started, how long they last, how often they happen, what other conditions your child has or has had in the past, and what medications they are taking. It may help to keep a diary of your child’s symptoms.

Younger children often use colourful language to describe their dizziness. They may say, “my brain is spinning,” “the house is shaking,” “I’m floating,” or “my tummy hurts.” This is helpful to the doctor. The doctor will do a physical exam. This includes checking your child’s motor development and looking for “red flags” such as:

• no head control at four months
• inability to sit unsupported at 7 to 9 months
• no vestibulo-ocular reflex (VOR) at 10 months
• inability to crawl or bottom shuffle at 12 months
• not trying to walk at 18 months
• inability to stand on one foot and keep balanced with eyes open for at least 2 seconds at 3 years of age, 5 seconds at 4 years of age, and 8 seconds at 5 years of age.

These developmental delays often carry over as poorer balance skills throughout childhood.

Some vestibular disorders are associated with sensorineural hearing loss. The results of your child’s newborn hearing screening will be taken into account. About 1 in 500 babies are born with permanent hearing loss. The number rises to 1 in 50 for babies in neonatal intensive care units (NICUs). Toddlers, preschoolers and older children will likely have their hearing tested by an audiologist.

You may be asked to fill in the Pediatric Dizziness Handicap Inventory. This questionnaire identifies problems 5- to 12-year-olds may have because of dizziness or imbalance. The Pediatric Vestibular Symptom Questionnaire might be used with 6- to 17-year-olds. Using these questionnaires can help the doctor or audiologist decide if vestibular system testing is called for, or what type of specialist referral might be most suitable for your child.

Diagnostic testing of the vestibular system assesses how well the inner-ear balance mechanism is working. No child is too young for balance function testing. The tests will be modified to suit your child’s developmental needs. Caregivers play an important role in successful testing. Information will be given beforehand about how you can best prepare your child as well as help during testing. The testing may be done over several appointments.

Treatment and management of balance and dizziness disorders in children

Children outgrow some dizziness and balance disorders. Others are more persistent. As with adults, treatment and management depend on the specific disorder and other health conditions.

Vestibular rehabilitation can help many children. Vestibular rehabilitation is a type of exercise-based therapy. Its goal is to help train your child’s brain to relearn how to balance and how to respond to signals from the vestibular and visual systems. The exercises will be adapted to your child’s developmental level. The therapist will suggest ways to help your child practice the prescribed exercises at home in a playful way. Children are often more successful at vestibular rehabilitation than adults because their brains adapt more easily to balance problems.

Sometimes medicine and surgery may be needed. Children with significant hearing loss may need a hearing aid, cochlear implant and/or listening therapy with an audiologist.

Vestibular disorders in children

The vestibular system in the inner ear is made up of the semicircular canals and otolith organs (utricle and saccule) that send information to the brain through the vestibular nerve. These structures are developed at birth. The vestibulo-ocular reflex (VOR) does not fully mature until about 2 months of age. The VOR maintains gaze stability during head movement.

A child’s ability to keep an upright position (postural stability) develops in step with motor development. A baby first is able to control the head, then the torso, and finally the ability to stand. Toddlers use
their eyes more than information from their skin, muscles and joints (proprioception) to balance. By 3 to 6 years of age, children use proprioceptive input in a similar way to adults. Communication between the brain and the 3 parts of the balance system – vestibular, eyes and proprioception – fully matures by 12 years of age.

The most common causes of vertigo (spinning sensation) in children are:
- **benign paroxysmal vertigo (BPV)**
- vestibular migraine
- head trauma (concussion)
- idiopathic (meaning with no known cause) vestibular disorders,
- **vestibular neuritis**

Less common causes of vertigo in children are:
- **Meniere’s disease**
- **benign paroxysmal positional vertigo (BPPV)**
- central nervous system tumours

Most children with vestibular disorders do not have vertigo. This is particularly the case when the vestibular impairment is present at birth (congenital) or affects both ears (bilateral vestibulopathy).

**Migraine-related disorders in children**

Dizziness and imbalance are symptoms of two episodic syndromes that may be associated with migraine and affect children – **benign paroxysmal torticollis (BPT)** and **benign paroxysmal vertigo (BPV)**. Children with BPT and BPV often have a family history of migraine. Research suggests children with these conditions have a greater likelihood of developing migraine later in life or having them at the same time as migraine (comorbidity). There is a possible progression from BPT to BPV, and from BPV to vestibular migraine.

**Benign paroxysmal torticollis (BPT)** is a rare disorder that is fairly harmless and short-lived. It consists of recurrent spells of tilting the head to one side - torticollis means “twisted neck” - in otherwise healthy children. Spells can be as short as 10 minutes or, in rare cases, last for up to 2 months. Other symptoms may include dizziness, looking pale, vomiting, irritability, or lack of muscle control and coordination of voluntary movements (ataxia), such as walking. Symptoms start as early as the first few months of life. BPT usually goes away by the time a child is 2 to 3 years old, but always by age 5.

**Benign paroxysmal vertigo (BPV)** is a common cause of vertigo that is often overlooked or misdiagnosed. Some practitioners may still refer to it by its older name, benign paroxysmal vertigo of childhood (BPVC). It commonly affects children but is not limited to childhood. BPV is characterized by sudden attacks of vertigo lasting for a few seconds to several minutes at a time and not brought on by movement or position. There is no loss of consciousness during at attack. Your child also may have:
- nausea, with or without vomiting
- nystagmus (abnormal eye movements) – this can be hard to detect, as children often shut their eyes during an attack
- **tinnitus** (ringing in the ears)
- sweating and paleness
- awkwardness, clumsiness or poor balance
- irritability

Most children are frightened by the symptoms and unable to stand without holding on to something. Once an attack is over, your child is likely to act normally.

While there is no specific test for BPV, various tests may be needed to rule out a more serious diagnosis. These may include:
- hearing tests
- **tests to assess balance function**
- neurologic tests
- imaging tests such as an MRI

BPV is often confused with its sound-alike, **benign paroxysmal positional vertigo (BPPV)**. BPPV is uncommon in children without head injury, concussion or cochlear implantation.

BPV is associated with delays in gross and fine motor skills. BPV usually affects children starting at 4 years of age and younger. Girls are affected more often than boys. The attacks usually happen every 4 to 6 weeks. The frequency of attacks goes down with age. BPV goes away along varied timelines.
BPV may be treated with low doses of carbamazepine (pronounced kaar-buh-ma-zuh-pee-n). Eliminating dietary and lifestyle triggers suggested for migraine may be helpful.

Middle ear infections in children

Middle ear infections (otitis media) are very common in young children. Often children with middle ear infections have problems with a blocked or infected Eustachian tube and fluid builds up in the middle ear. This condition is called middle ear effusion (MEE) or otitis media with effusion (OME). As well as hearing impairments that may affect speech and language development, MEE impacts a child’s balance and general motor function.

Sometimes MEE occurs repeatedly or persistently. If this happens during an important stage of a child’s development, such as learning to walk, overall development may be delayed even after MEE is over. Children who already have motor or vestibular problems before having MEE may be particularly affected.

MEE usually results in unsteadiness that is noticeable but not striking. Occasionally, children with an acute middle ear infection will have a sudden and dramatic episode of vertigo, nausea, vomiting, and an inability to walk. In these cases, complications such as meningitis need to be ruled out.

Sensorineural hearing loss in children

Sensorineural hearing loss (SNHL) is caused by damage to the hair cells in the inner ear or the nerve pathways leading from the inner ear to the brain. It is by far the most common type of hearing loss. Up to 70% of children with SNHL in both ears have a vestibular problem and 20 to 40% have bilateral vestibulopathy. Children with profound SNHL in one ear (unilateral) have similar risks.

It is important for children with SNHL to be screened for vestibular dysfunction. Children with complete vestibular loss in both ears have serious delays in controlling posture and movement.

Symptoms may include:
- delayed walking
- frequent falls
- decreased ability to detect gravity
- difficulty thinking, understanding, learning, and remembering (cognitive dysfunctions)

As a result, children with SNHL may have:
- attention deficit disorders (ADD)
- problems with learning and reading
- spatial disorientation
- difficulty sequencing
- memory-retention problems.

Research suggests early diagnosis of complete loss of vestibular function in both ears as well as timely rehabilitation reduces future developmental deficits.

Conditions in children that affect both the hearing (cochlea) and balance (vestibular system) parts of the inner ear include:

- **Congenital inner ear abnormalities**, a major cause of sensorineural hearing loss in children. Causes include: incomplete partition type 1 to type 3 (formerly called Mondini malformation); semicircular canal dehiscence (SCD); and enlarged vestibular aqueduct (EVA).

CT and MRI scans can diagnose these abnormalities. Hearing loss and balance impairment may worsen over time. Children with congenital inner ear abnormalities may have severe vertigo lasting days to weeks.

These abnormalities are sometimes mistaken for vestibular neuritis. Congenital inner ear abnormalities may occur on their own or along with a genetic disorder such as Waardenburg, CHARGE or Pendred syndrome.

- **Genetic disorders** – Type 1 Usher syndrome is the most common autosomal recessive cause of SNHL and vestibular impairment. An autosomal recessive disorder means two abnormal genes must be inherited, one from each parent.
• **Meningitis** – about 10% of childhood survivors of bacterial meningitis have SNHL and loss of balance function.

• **Congenital cytomegalovirus (CMV)** – is a rare infection affecting between 0.4 to 2.3% of babies at birth. Up to 90% of babies show no early symptoms however 8 to 15% of those infected will go on to develop SNHL.

• **Congenital sensorineural hearing loss in one ear** (unilateral) – about half of children born with a “dead ear” have no vestibular nerve. The balance structures in the affected ear may also be damaged. This can lead to balance impairment and some delay in motor development.

• **Auditory neuropathy spectrum disorder (ANSD)** – many children with ANSD have impaired balance function. They often have more than one risk factor for developing both hearing loss and balance impairment.

A cochlear implant (an electronic device that partly restores hearing for those with SNHL) comes with a risk of impaired balance. Ask your child’s audiologist and doctor about the risks and benefits of cochlear implantation.

**Sources**

View sources used for this handout:
https://bit.ly/2Kn1ouA

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If you find the information in this handout valuable, we ask you for your help. The cause of supporting those affected by balance and dizziness disorders with up-to-date, evidence-based information written for Canadians, needs you. Will you consider becoming its champion by making a gift online or by mail?

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