Ear Infection and Glue ear

Ear infection is an inflammation of the middle ear (between the eardrum and the inner ear) that occurs when fluid builds up behind the eardrum. Figure 1 illustrates the infected cavity inside the middle ear.

![Figure 1](https://example.com/figure1.png)  

It is usually caused by bacteria. It often causes earache and a child may have a fever. Babies and young children tend to get these types of infections more often than adults due to their still developing immune system, the fact that they are more exposed to germs due to exploring objects through their mouths, as well as the underdeveloped Eustachian tube that regulates pressure inside the middle ear. As the Eustachian tubes are smaller and more level in children, it makes it difficult for fluid to drain out of the ear, even under normal conditions (see figure 2).

If these tubes are swollen or blocked with mucus due to a cold or other respiratory illness, fluid may not be able to drain so effectively or at all (James, Nelson & Ashwill, 2013:489; Jones, 2004:117; Maw, 1995:iv,5).

According to the National institute of Deafness and other Communication Disorders (2015), five out of six children will have had at least one ear infection by their third birthday. The scientific name for an ear infection is otitis media (OM). Otitis media with effusion (OME) sometimes happens after an acute ear infection has run its course and fluid stays trapped behind the eardrum. A baby or child with OME may have no symptoms. Chronic otitis media with effusion (COME) happens when the fluid remains in the middle ear for a long time or returns over and over again, even though there is no infection. The fluid becomes thick and dark.
COME makes it harder for children to fight new infections and also can affect their hearing. This condition is also referred to as glue ear (James, Nelson & Ashwill, 2013:489; Maw, 1995:iv). In most cases children with glue ear do not present with clinical obvious signs or symptoms of infections and as a result can go unnoticed for many months (Maw, 1995:1). Figure 3 illustrates the build-up of fluid inside the middle ear.

![Figure 3](ENT Clinic, 2015).

**Vestibular dysfunction and OM**

There could be many reasons for the vestibular system to not function optimally. One of the possible causes of vestibular disturbance in babies and young children is OM (Vestibular Disorders Association, 2016). Balance problems, such as clumsiness is often reported in children when a middle ear effusion is present. They are more accident-prone, and OM is possibly impairing their motor development (Casselbrant et al., 1995).

There is evidence of studies of labyrinthine function (inside the inner ear) in children with or without middle ear effusion to confirm that the vestibular system is adversely affected. Bilateral OM has a more marked effect on balance than unilateral OM and most of the balance problems experienced resolve with the placement of grommets (Bluestone & Klein, 2007:340).

If vestibular dysfunction occurs early in development, it slows the development of equilibrium and protective reflexes and motor-control tasks such as sitting unsupported, crawling, standing, and walking (Kaga, Shinjo, Jin & Takegoshi, 2008). In addition, an impaired vestibulo-ocular reflex (VOR) from vestibular dysfunction can have far-reaching impacts on an older child’s ability to keep pace with schoolwork. The VOR is responsible for maintaining clear vision during rapid head movements. Stable vision is important for learning to read and write and for developing fine and gross motor control. If COME is left undiagnosed and untreated, the influence on the vestibular system can have adverse consequences for a range of functions (Vestibular Disorders Association, 2016).

The precise manner in which OME/COME causes balance dysfunction is still unclear. Due to thin membranes separating the middle and the inner ear, it is possible that changes in air pressure and the transfer of toxins may cause pathological changes in the inner ear and subsequently result in balance difficulties. There is a suggestion that children with OME/COME are more reliant on visual rather than vestibular and proprioceptive inputs for maintaining postural control.
This could imply that vestibular information is reduced in magnitude or not used optimally (Casselbrant & Mandel, 2005; Casselbrant, Villardo & Mandel, 2008).

Therefore, in babies who suffer from OMECOME and who as a result thereof might be more visually dependent, activities that jumbles the visual environment (such as them bouncing on a ball, swinging through the air, turning a head to follow mommy walking passed), could promote a sensory mismatch which, in turn, could make the baby clumsy (i.e. fall over from a sitting position when the head turns).

Most babies and young children will get an ear infection at some point in time and usually a course of antibiotics or the approach of watchful waiting (where mommy and doctor is first allowing some time to pass before medical intervention or therapy is used) solves the problem effectively. There are however cases where babies present with chronic middle ear infections (some of which will go unnoticed and others which will progress to COME). Not all babies present with typical symptoms of an ear infection at times (such as fever, being fuzzy or pulling of the ears). And, we know now that OME and COME may not present with any typical clinical symptoms at all. As babies cannot describe their symptoms it can lead to mis- and underdiagnoses.

Parents should then be on the lookout for subtle symptoms in their babies such as:

- Delaying to learn to sit, crawl, stand or walk
- Motion sickness
- Prolonged poor sleeping patterns
- Passive or very quiet babies
- Fuzzy or unhappy babies
- Babies constantly breathing through their mouths / stuffy nose or snoring
- Babies being slow to feed
- Crying when movement is initiated (for example: bouncing on a ball or trampoline, swinging, unexpected changes in movement etc.)
- Lack of babbling noises

Apart from a medical evaluation at a medical practitioner or an ENT (ear, nose and throat specialist) it is highly encouraged to have babies and young children assessed by an audiologist on a regular basis. More specifically, the use of an acoustic immittance test to evaluate the eardrum and the middle ear space behind the eardrum can provide valuable information for further investigation if parents are feeling concerned about their baby’s ear health in general.

BabyGym® offers an excellent programme to assist parents to stimulate the vestibular system of their little ones in an effective, yet playful manner. Whether your little bundle suffers from regular OM or not, the proper stimulation of this system and the early identification of factors negatively impacting on the vestibular system are vital for neurodevelopment, and later readiness to learn.
Reference List:


