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Institutionen för Kvinnors och Barns Hälsa

**Idiopathic toe-walking in children; prevalence,
neuropsychiatric symptoms and the effect of
botulinum toxin A treatment.**

AKADEMISK AVHANDLING

som för avläggande av medicine doktorexamen vid
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ABSTRACT

Idiopathic toe-walking (ITW) is a term used to describe a state in which a child, in the absence of a known cause, walks on his or her toes, as compared to the normal heel-toe gait. The diagnosis is thus used when other defined causes are excluded. Problems that may develop with untreated ITW are shortened calf muscles with limited mobility in the ankle, pain, balance and foot problems. It has been shown that impaired ankle mobility is common in patients seeking orthopaedic help for foot problems. It is not uncommon for children with ITW to have problems playing sports or to be bullied.

It has thus far been unknown how common it is for children to walk on toes. The first study in this thesis evaluates the *prevalence* of ITW in children evaluated at their final check-up (aged 5.5 years) at their local Child Welfare Centre (CWC). The result shows that out of 1,436 examined children, 2.09% were still toe walking and 2.79% had been toe-walking but stopped prior to the final check-up.

Neuropsychiatric conditions include among others ADHD, tics and autism. It is known that toe-walking is a common phenomenon in children with autism. The general impression among clinicians working with children and young people with other neuropsychiatric conditions is that toe-walking is more common also among these children. This potential comorbidity had not previously been investigated. The second study in this thesis shows that out of 51 children referred to Astrid Lindgren Children's Hospital for ITW and evaluated for neuropsychiatric symptoms with a validated screening tool, about 25% are likely to have some sort of neuropsychiatric problem.

There are many treatment options for ITW ranging from observation and stretch exercises to cast treatment and surgical procedures. *Treatment of ITW with botulinum toxin A (BTX)* is increasingly being used in clinical practice despite little scientific evidence as to its effectiveness in children with ITW. Studies 3 & 4 examine whether BTX treatment can improve the walking pattern in children with ITW, wherein Study 3 cautiously suggests that it can. Study 4 is a randomised controlled study that compares two groups of children with one group being treated with casts for 4 weeks and the second group receiving the same type of cast treatment in addition to treatment with BTX injections in the calf muscles. However, the results show that BTX does not improve the treatment outcome compared to cast treatment only.

Clinical implications: The prevalence and early spontaneous course of ITW in children aged 5.5 years has been established and will affect the accuracy of the information we can give parents and influence the choice of treatment strategy for these children. We have become aware that children with ITW can have a variety of neuropsychiatric problems and that ITW should not always be seen as an isolated phenomenon. It is furthermore advisable to stop BTX treatment for ITW, thus preventing children from being exposed to ineffective treatment.