

# (Non)orthopaedic problems of children and adolescents

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The purpose of this article is to briefly describe some of the most common conditions related to the health of the locomotor system of children and adolescents that pediatricians and family doctors encounter.

## 1. Foot issues

The baby foot examination includes an evaluation of the correctability of the suspected deformity. The axis of the foot in relation to the lower leg should also be evaluated simultaneously. *Pes calcaneus* is frequently present at birth, the foot is extended dorsally to its maximum but can be easily positioned into plantar flexion. If there are no lower leg deformities, this condition will improve spontaneously.

*Metatarsus adductus* is characterized by adduction of the forefoot in relation to the rearfoot, so the lateral edge of the foot is curved. While observing the foot from below, the examiner holds the heel with one hand while with the other hand applying pressure to the medial side of the forefoot in the lateral direction. If the normal position and the straight lateral edge of the foot can be achieved with gentle pressure, the foot is correctable. Stimulation can be helpful in babies who appear to have feet twisted inwards. By tickling the lateral edge of the foot, the baby will spontaneously correct the position of their foot by activating peroneal muscles. Any deformity that cannot be corrected by gentle manipulation requires consultation with a paediatric orthopaedist.

Formation of the longitudinal (medial) foot arch is related to walking. In babies and small children, it

is filled with fatty tissue which gradually declines so the medial arch starts to appear, only to be fully formed by the age of about 6. On clinical examination, the medial arch becomes clearly visible when the child stands on tiptoes, or when the child is sitting and the great toe is pushed up by the examiner. It should be observed whether the medial arch is normally elevated, touches the ground, or is too high. When observing the feet from below, the reddish skin of the metatarsal, lateral foot edge, and calcaneal weight-bearing skin in the loaded plantar zone can be normally noticed as well as the whitened skin of the non-loaded medial part of the sole. This provides information about functional weight-bearing. Observing the feet from the back, when climbing on the toes, the heels from the valgus position normally transit inwards. Severe forms of flatfeet, in which weight-bearing is greater on the medial than on the lateral side (the medial arch of the foot is in contact with the floor), callus formation, painful feet, absence of the normal heel transition, and any observed asymmetries between the feet requires a paediatric orthopaedist consultation.

## 2. Leg issues

During normal development, infants and toddlers often have bowlegs (*genu varum*). *Genu varum* in steadily walking children needs to be investigated since it is expected that they become slightly knock-kneed (*genu valgum*), which is especially

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noticeable at the age of about 3–4. With further growth, the legs become straight, although up until the age of 10 most cases of genu valgum are physiological but give cause for concern if the child is obese. In adolescents, a slight genu varum or valgum can be tolerated. Any asymmetry of the lower extremities axis and leg length discrepancies require referral to orthopaedic specialists.

Children have naturally increased anteversion of the femoral neck in relation to the femoral condyles, which is often a reason for the *in-toeing gait* and sitting in the shape of the letter W. Neck anteversion naturally decreases, and most children by the age of 10 outgrow this condition.

### 3. Spine and chest issues

While examining the spine, the observer should ask the child to bend down while keeping the horizontal position of the pelvis, knees perfectly straight, and hands down aligned. This can be more precise if the patient is seated. Sitting position also excludes the influence of the leg length discrepancies if present. It is important to spot the rib or lumbar prominence indicating *structural scoliosis*. The scoliometer is helpful here. Patients with a rib or lumbar prominence of 5 ° or more require an examination by a pediatric orthopaedist and a special spine radiogram. If the rib asymmetry is below this value, they can be referred to a physiatrist with experience in paediatric and adolescent physiatry. However, caution is needed in obese patients whose scoliometer rib asymmetry may be falsely less severe.

*The fixed hyperkyphosis of the thoracic spine or kyphosis of the lumbar spine* requires an orthopaedic examination so that thoracic hyperkyphosis doesn't even out as the patient straightens up from a forward-bending posture. Also, children and adolescents should be able to touch the floor

with their fingertips while keeping their knees straight. If unable to do so, this indicates contraction of the hamstrings which often goes together with thoracic hyperkyphosis, contracted pectoral muscles, and pelvic tilt. To examine the pectorals, the shoulders of the upright patient are pushed backward. If the pectoral muscles are contracted, the shoulder remains in front of the thoracic plane. Even if there is no fixed hyperkyphosis, a permanent kyphotic posture can trigger juvenile kyphosis (Scheuermann's disease) during puberty which should be corrected on time, so a referral to the physiatrist is recommended.

Because of the sternum retraction in the *funnel chest (pectus infundibuliforme)*, cardiac and pulmonary function are the most important to assess in severe cases, as well as psychological distress. Scoliosis and thoracic spine hyperkyphosis may also be noticed. Surgical correction by a thoracic surgeon is reserved only for very severe forms.

*Keeled chest (pectus carinatum)* is not associated with cardiopulmonary dysfunction but is frequently associated with Scheuermann's disease. The treatment is conservative with a brace and should be implemented primarily in schoolchildren, as it will not have much effect by the time of adolescence.

## REFERENCES

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