References

Cusick Beverley: Progressive Casting and Splinting for Lower Extremity Deformities in Children with Neuromotor Dysfunction. Therapy Skill Builders, 1990

LeVeau Barney, Bernhardt Donna: Developmental Biomechanics. Physical Therapy, Vol.64, Number 12, December, 1984

Jones, Lester J.: Clinics in Podiatric Medicine and Surgery, volume 11, Number 2, April 1994

Magee, David: Orthopedic Physical Assessment. W.B. Saunders Company, 1992

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W SITTING, KNEELING, LONG LEG & SIDE SITTING Perils, Problems, & Prevention

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Toddlers, preschoolers and children are flocking to my office in increasing numbers. The concerns from parents range from:

"My child is clumsy when (s)he walks or runs."

"My child walks in a funny way."

"My child trips over his/her feet when (s) he walks or runs."

"My child is flat footed or pigeon toed."

"My child is knock- kneed."

"My child has problems sitting or standing straight."

"My child complains of hip, knee or foot pain or "pain in the legs at night."

Where did this all begin?

Babies over 6 months are meant to be sitting on their buttocks with backs straight and legs crossed. This promotes symmetry and allows the trunk (or core) to develop strength with rotation of the torso. The child is able to cross midline to play with both hands and move in and out of sitting. Knees are not supposed to be weight bearing structures when children are sitting; weight should be taken through the buttocks with or without weight through the feet.

Cross leg sitting

Before babies develop sitting balance, they should have been practicing tummy time for many months after birth. First they lift their heads up and then, by six months, they become capable of lifting their chests/trunks off the floor thereby weight bearing on their hands, pelvis and hips. The legs should be in line with the pelvis, and close together. When they start to push up onto hands and knees, they are able to get into sitting by rotating on to one side and then going into cross legged sitting. Trunk rotation and weight shifting are necessary for toddlers to run and to maintain balance while challenging them to do more complex gross motor tasks.

With the “backs to sleep” regime to prevent SIDS, babies are not put onto their tummies frequently enough during their awake time. They therefore do not practice the skill adequately and do not develop good hip extension. The consequence of this restricted hip mobility is pushing up to sit with legs wide apart. This causes them to then go into sitting with their bottoms between their feet (known as W sitting). The feet are either turned in or out. When placed in sitting, their legs are wide apart either out straight in front of them or in a diamond position.

W sitting

This is a sitting position where the child sits with the hips rotated inward, the knees bent and the legs placed on each side of the buttocks. This creates a wide base of support. The child can play more easily with toys with his/her hands that are freed up because of greater trunk stability and balance. Naturally a child will sit in the easiest position possible. Balance and righting reactions – the precursor skills for standing, walking and running - do not develop normally.

There are both short-term and long-term consequences to W sitting. First of all, this position makes it more difficult for a child to rotate, weight shift and cross midline during play. Children are forced to move by bending their bodies forward. True trunk strength is not developed. Another issue with W sitting is its impact on the development of the lumbar spine, which remains in a flexed position instead of developing its secondary curve that is arched.

When a child sits in a W position, the feet will be tucked in and facing each other (one or both) or will face out (one or both). The muscles on the outsides of the thighs get tight and the back becomes rounded often with a neck that pokes out.

BIOGRAPHY TEMA STEIN

Tema Stein graduated from McGill University with a Bachelor of Physical Therapy degree. She received her DO (MP) - Doctorate in Osteopathy Manual Practice in 2001. She has spent most of her professional career working with the paedicatric population. She has completed courses in neurodevelopmental therapy, including advanced and baby courses; lower extremity and foot courses; seating courses and other manual therapy courses

She has served on various professional government and public advocacy organizations. She has taught numerous courses/workshops across the country, for universities, other therapists, osteopathic students and general audiences

Tema has over thirty eight years experience as a practicing therapist and department head at major paediatric facilities in Toronto and Vancouver. She is a partner at Footprints Therapy, which she founded in 1988. Footprints is the largest and one of the most highly respected private practices in Canada, providing PT, OT, osteopathy, massage therapy and naturopathy for babies, children, adolescents, and, now, adults with a broad spectrum of needs. These may include orthopaedic or neurological problems from birth or acquired injuries. She has a special interest in linking structure and function and works with orthotists, podiatrists and other therapists/specialists to provide the most appropriate intervention.

Alarm bells – when to seek help

As the baby gets older, (s)he should be able to tolerate progressively more and more tummy time. If the baby cries when doing tummy time, the baby is uncomfortable. This means that something structurally is blocked. Perhaps the baby is having difficulty lifting the head up. There may be a restriction between the head and the neck or the neck and the upper thoracic spine. If the baby cannot push up on extended arms at 5 months, there may be restrictions lower down in the spine. The hips may be tight. There may be tightness on the outside muscles of the legs, making it difficult to bring the legs in line with the pelvis.

If this is the case, the child will go up on to hands and knees with the legs apart. The only way the baby can get into sitting is by rocking backwards and sitting in a W sitting position.

If the child cannot achieve proper sitting, then the environment should be modified for him/her. The child could sit on a chair or bench as well with feet supported. If the feet are not supported, then the child might hook the feet around the rungs of the chair and this is not good. This is also W sitting. Children should not sit on their knees at meal time either because this will also cause the hips to be internally rotated and put the feet in a position of being tucked in or out. Side sitting is not an alternative because the legs are in two different positions causing a pelvic asymmetry in sitting as well as in standing. In standing, one leg will appear shorter than the other. This could eventually become a postural scoliosis. Sitting on the floor with legs out in front is not advisable both because the hips are internally rotated and the spine is rounded.

Solutions

Children do NOT outgrow deformities that result from persistent W sitting.

However, problems can be addressed and corrected by seeing a trained osteopath for structural work and a paediatric physiotherapist or occupational therapist for facilitating normal development. Early intervention - before the baby develops aberrant ways of moving - is essential.

An osteopath, with expertise in paediatrics, is trained to look at the structures that may be restricted and release them with gentle, non invasive techniques.

The physiotherapist or occupational therapist looks at blocks to normal development and normal movement patterns and facilitates activities to overcome them so that the child's development continues to progress normally.

The child might benefit from orthotic intervention from a podiatrist or orthotist if the structures above the feet are balanced and mobile. The orthotics can correct a flat foot or cue the foot that normally turns in to turn out at heel strike and the paediatric physiotherapist/ osteopath/orthotist can assess for the need.

W sitting with left foot in and right foot out

W sitting with feet out

In standing, the child will have the knees facing in (knock kneed) and the feet facing in (pigeon toed) or facing out with a presentation of flat feet (pes planus). The child will either trip over his/her feet when walking/running or require orthotics for flat feet.

Kneeling

In this position, the hips are rotated inward. The lower back is often rounded. The feet are either turned in or out.

Kneeling with feet turned in

In standing, the knees will be facing each other and the feet will either be turned out or flat depending on how they were positioned in kneeling

Long leg sitting

The hips are rotated inward. The pelvis and lower back are rounded and the chin is often poking forward.

Long leg sitting with left leg turned in more than the right one

In standing, the upper/mid back is rounded, the lower back is flat, and the feet are pigeon toed.

Side sitting

One hip is turned in with weight taken on the inside of the foot. The other hip is turned out with weight taken on the outside of the foot. The spine is side bent and the pelvis is asymmetrical.

Left side sitting

In standing, the pelvis may be rotated and one leg may appear shorter than the other. There may be a postural scoliosis as well.

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Ring Sitting

Ring sitting

The hips are wide apart. The child cannot rotate the torso to play on one side. The child will get into prone or into a creeping position by flopping forward. The muscles on the outsides of the hips become very tight.

Ring sitting - leaning forward

In standing, the legs are wide apart and the child will walk with a waddling type of gait.

Repercussions on the adult population

Where do the lower back/hip, knee and foot problems start? It would be interesting to track the developing baby through childhood to adult and beyond. Lower spine and hip problems, tight hip flexors, iliotibial band tightness, chondromalacia patella, patella femoral instability or recurrent subluxations of the patella, patella femoral syndrome, medial tibial torsion if the feet turn inward or external tibial torsion if the feet turn outward, and a multitude of foot complaints may have had their origin in infancy and early childhood.

Prevention

The way to prevent the child from going into reverse W sitting is to not allow it to occur in the first place. This starts when the baby is born. Babies should be placed on their tummies to play during awake hours from birth onwards. As they develop extension of their core, they develop the ability to bring their legs in line with the pelvis. When they push up onto hands and knees, they are able to get into sitting with rotation of their bottoms to one side of their legs. When babies of six months are in sitting, the legs should be crossed with the knees in line with the pelvis. The toys should be placed to one side or the other to allow for rotation of the torso and the crossing of midline with the upper extremities for play. When the babies push up onto hands and knees, the parent can guide the knees to remain close to each other so that the baby naturally assumes sitting with rotation of the body to the side.