

# Families and babies: An ergonomic and postural guide during the COVID -19 Pandemic

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## ABSTRACT

This article was created to help clinicians better communicate with new parents and family members on everyday posture and ergonomic advice when looking after young children. This information is particularly useful in the current COVID-19 pandemic as the lockdown situation can exacerbate previous injuries or result in new musculoskeletal complaints. Additionally, this article aims to provide useful websites and links for additional information to help parents purchase appropriate furniture for their children based on EU safety law and recommendations.

**Key words:** Ergonomic, Pediatric, EU law and regulations, safely and spinal hygiene

### Introduction

During the COVID-19 pandemic and lockdown, a sizable portion of the population struggled with both mental and physical aspects of the isolation. Looking after young children has been a challenge for many parents who are also attempting to perform their employment responsibilities online at home (another challenge requiring their attention as for some it is requiring new technological education). This manuscript is designed to present essential information for practitioners to share with parents concerning posture, ergonomics and the importance of promoting their child's proper skeletal and neurological maturation. Sharing information in this format, given that attending medical appointments in person is more of a challenge these days, may help to enrich the telehealth experience between clinician and patient families.

Ergonomic advice could help optimize safety for both parent and child, improve parent spinal function, maximize efficiency of daily activities and reduce pain or discomfort. The three broad categories of postural ergonomic advice can be categorized as standing, seated and lying down. The goal is to promote safe and transferable movement pattern skills, for all members of the family and caregivers. Hip hinge, squat and forward lunge are some of the commonly used movement patterns that would help achieve a correct spinal alignment while handling young children and their equipment and furniture (highchairs, car seats etc.).

The ability to maintain the center of gravity is important. Posture is controlled through the sensory motor system. Our posture is the total output of all sensory (proprioception, visual and vestibular input) and motor input.<sup>1</sup> Demonstrating a posture examination either using

a posturography machine in the clinic, a plumb line or even a side view picture standing at home with and without holding their child, can help parents appreciate where they bear their weight during each task. Correlating the findings of postural examination and presenting complaints can explain if aches and discomforts experienced are directly linked to posture.<sup>2</sup>

As indicated in the picture below, a number of caregivers push the hips forward to stabilize their position and increase the lumbar lordosis significantly. This creates a posterior overall center of gravity, which can be linked with irritation in the hips and lower back.



Picture 1: Mother is demonstrating good and poor habits with posture when holding her child.

Immediate tips and changes that can be implemented include lifting the crown of the head, tucking the chin back slightly, dropping the shoulders, and slightly widening the stance.

Another simple and effective test is the standing balance test known as the Modified Clinical Test of Sensory Interaction in Balance (CTSIB-M).<sup>3</sup> It is a very useful test that can be modified during an in-office or telehealth visit which challenges the three main sensory categories (proprioception, vision and vestibular function) that contribute to balance.

The test would normally be used and interpreted by the chiropractor in the clinic. However, if this is not possible because you are conducting a telehealth visit, balance may be evaluated with eyes open and with eyes closed. Closing one's eyes reduces the visual input into the system and the person is more reliant on the use of vestibular and proprioceptive input. This is a simple test that can be done safely at home by counseling the patient to perform the test standing clear of furniture, stair wells or sharp objects and preferably have another person to observe or support them if they sway or have difficulty balancing when performing each step of the test. This test provides some insight into the integrity of each of the sensory systems that supports balance and can provide information to the clinician to help devise remedial exercises or recommend further diagnostic testing, in clinic.

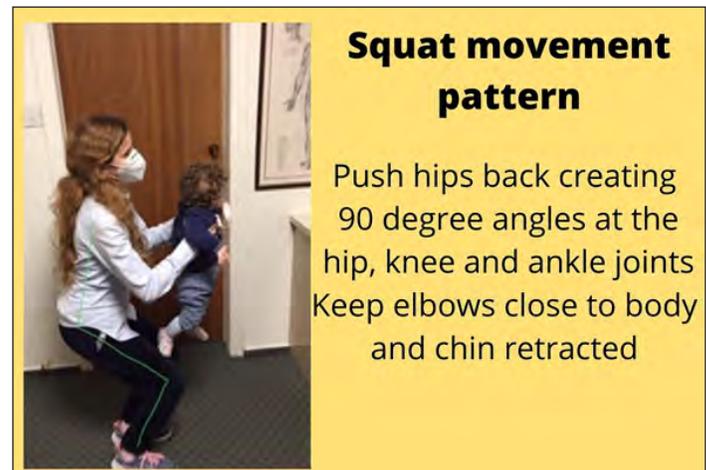
#### **Sleeping and lying down: position safety and ergonomic advice**

In the early 90's the introduction of 'Back to Sleep' campaign was instituted to reduce infant mortality due to the sudden infant death syndrome (SIDS).<sup>4</sup> Shortly thereafter, the 'tummy time' campaign was introduced in response to developmental concerns about sole supine positioning of infants.<sup>5</sup> The softness of the skull and bones is evident in early life as both membranous and cartilaginous bone are still undergoing secondary ossification.<sup>6</sup> Alternating between sleeping on their back (supine) and tummy time ensures an even distribution of forces on the child's cranium. Hence, it is important that parents are encouraged to use supervised tummy time as early as possible after birth.<sup>7</sup> Providing them with links to appropriate online information is a potentially effective way of sharing information with the family, especially during the lockdown.

According to the European Foundation for the care of the newborn, parents are advised to place children on their back to sleep, on a firm, flat, waterproof mattress with no pillows or toys. Additionally, parents are advised to protect bedding from covering face, mouth, and nose.<sup>5</sup> Encouraging tummy time and playtime on the floor ensures that the child has ample opportunity to recruit the appropriate

musculature to work against gravity to create the lordotic spinal curves in the cervical and lumbar region. This also allows the child to utilize, express, and later integrate their primitive reflexes which is necessary for functional motor milestone attainment.

The guidelines from the European standards<sup>8</sup> for the care of the newborn can be used to guide parents when selecting crib mattresses and bolsters/bedding, as well as ensuring there are no gaps larger than two fingers between the sides of the crib and the mattress to avoid accidents. Once the baby is able to sit up by him/herself, it is advised to move the baby mattress to a lower position. Furthermore, when the child reaches the side rail up to the level of the nipples, he/she has outgrown the crib and can now sleep in a bed.<sup>9</sup> Ergonomically, parents can employ the hip hinge mechanism and spinal roll positioning when lowering the child into the crib and returning to an upright position. Correct use of a squat pattern can help the caregiver protect their back. And in addition, equally distributing the weight provides a safer more stable way of lifting a child.



Picture 2: Mother performing a squat with her child.

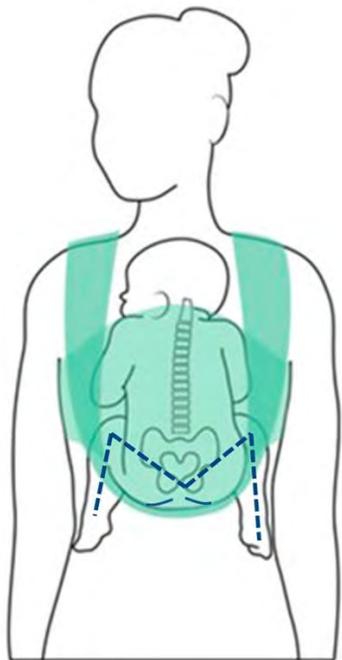
Employing the same safety information is essential when choosing a pram or stroller. A flat, firm reclining interior must be considered to ensure the safety of the child while sleeping. Especially during this pandemic, when visiting a store in person to "try it on for size" for comfort is less feasible, attention to the details of ergonomics and height is critical. It is essential that clinicians direct parents to safety guidelines and ergonomic advice to help them choose the best possible pram that would suit both them and the child. Some simple questions that would help the decision making are: what is the purpose of this pram? Small walks or daily long commutes? Consider the type of wheels and suspension. Will both partners be using this pram? If both, adaptable handles are a good idea so that it helps them maintain a better posture. If one partner has

lower back issues perhaps consider a hand-brake instead of a foot-brake. How much space is required for storage or portability and what weight do you want the pram to be?

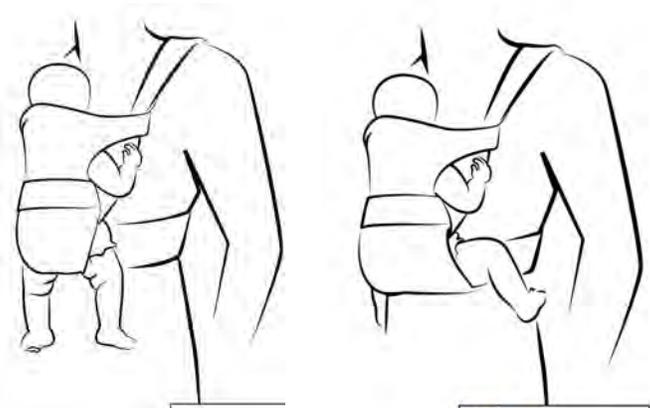
Considering all these points prior to making a purchase is important as these features will have an impact on the musculoskeletal system of both parent and child. The EU law specific for prams is the EN 1888—1:2018.<sup>10</sup> It provides specific requirements for height and weight of children as well as safety criteria on material and design.<sup>10</sup> Clinicians can encourage parents to have a closer look at the manufacturer’s requirements for safety and be familiar with the applicable laws. It is also helpful to have contact information for any professional or community service organizations (like the local law enforcement center) that may provide complementary guidance or installation of equipment in motor vehicles.

**Holding and babywearing**

Babywearing to transport children has been utilized for centuries and in many civilizations dating back to when humans lived in tribes and foraged and moved constantly to find safe haven. Now, with a modern twist, it has become popular again. This practice has both positive and negative aspects to consider. Positives are that it allows a close bond between the family member and the infant, activation of the vestibular system though constant movement and change

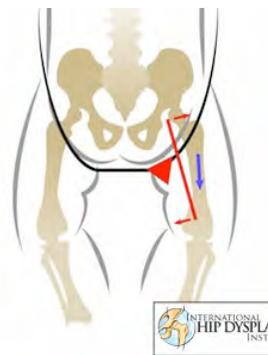


**Recommended:** Thighs spread around the mother’s torso and the hips bent so the knees are slightly higher than the buttocks with the thighs supported. Illustration courtesy of the International Hip dysplasia Institute (IHD) from the Baby Carriers & Other Equipment Hip-Healthy Products, [click here](#) to see full statement online.



Not Recommended for prolonged use during babywearing (narrow based carrier).

Better.



Thigh NOT supported to the knee joint. The resulting forces on the hip joint may be inappropriate for prolonged use when infants have loose hip joints or hip dysplasia.



Thigh is supported to the knee joint. The forces on the hip joint are minimal because the legs are spread, supported, and the hip is in a more stable position.

Illustrations courtesy of the International Hip dysplasia Institute (IHD) from the Baby Carriers & Other Equipment Hip-Healthy Products, [click here](#) to see full statement online.

of directions, as well as early socialization.<sup>11</sup> However, given that the pelvis and long bones are not skeletally mature and still undergoing ossification, both parents and clinicians need to be attentive to the positioning of the child in the baby carrier. The position should at no time create traction of any articulation and limits should be set on the length of time that infants spend in it if sufficient range of motion is not achievable.

According to the International Hip Dysplasia Organization, hip dysplasia is the most common deformity in new-born as it can affect 6 in 10 infants.<sup>12</sup> It is important that when using a baby wearing device or carrying your child, their

hips are spread and the imaginary letter ‘M’ is maintained at all times. This ensures a better alignment of the bones where both the hips and knee joints are flexed. Their website has helpful advice and illustrations that can be downloaded to be distributed to parents.

Giving advice to parents about their “wearing posture” would be advantageous as well. They should be instructed to always strap on the carrier when seated and adjust the straps to support their own bodies as well as the child’s. According to UK Sling Consortium<sup>10</sup> the five important points for safety seen in Table 1 are:

1. The tension in the support straps of slings and carriers should be tight enough to prevent the child from slumping which can hinder their breathing and hurt the adult’s back.
2. Always keep the child in view, face uncovered, at all times and,
3. Keep them close enough for the adult to tip their head down and kiss the top of the child’s head or forehead.
4. A child should never be curled so their chin is forced onto their chest as this can restrict their breathing and,
5. Adjust the carrier or sling so that the child’s back is well-supported and their stomach and chest are against the adult’s chest and to prevent slumping and maintain airway patency.<sup>10</sup>

Acronym	Explanation
T	Tight support straps
I	Child in view at all times
C	Close enough to kiss
K	Keep chin off chest
S	Child’s back is well supported

Table 1: TICKS used with permission of the UK Sling Consortium<sup>13</sup>

**Ergonomic and safety tips for a child in a car**

According to the EU law all children must travel in a child seat, booster seat or booster cushion’ up to the age of 12.<sup>14</sup> All children under 150cms or weighing less than 36kg must be restrained appropriately in a moving vehicle. The safest seat for a car seat is the back seat of the car in a rear facing direction, particularly for children up to the age of three. In a passenger seat with an active airbag, rear-facing child restraints must not be used. However, in an emergency, if a baby is transferred in the front passenger seat in a rear direction then the airbag on that side must be deactivated, while keeping all other mechanisms in place.

Positioning of the child in the car seat is important for safety and comfort. It is important to remove excess layers of clothing so that the straps fit well in the shoulders of the child. Hips preferably should not be pushed in adduction but rather maintain the — ‘M’ Shape (Flexion at the hip

**Baby Slings**

Not Recommended for prolonged use (cradle position holds the thighs together):



Baby carriers that force the baby’s legs to stay together may contribute to hip dysplasia.

**Better:**



Baby carriers should support the thigh and allow the legs to spread to keep the hip in a stable position.

Illustrations courtesy of the International Hip dysplasia Institute (IHD) from the Baby Carriers & Other Equipment Hip-Healthy Products, [click here](#) to see full statement online.

and knees joints). Parents should be aware of their own positioning when transferring the child in and out of the car seat. They can use a squat to lift the child and hip hinge to place in the car seat. The new car seat comes fitted with a swivel mechanism, which facilitates parents using a hip hinge mechanism to place the child in the car seat. This helps safeguard the integrity of the parent's musculoskeletal system.

### Highchair safety and ergonomic information

Highchairs are another piece of furniture that most families will inherit or purchase. It allows the child to sit at the level of the table, observe family members and improve their social and motoric milestones. However, it is essential that the design of this is steady with a large frame, a footrest for the child and an appropriate restraining system as high chairs provide one of the leading causes of accidents in homes. According to the EU Injury Database (IDB)<sup>15</sup> data indicate annually approximately 7,700 injuries to children 0-4 years in the EU 28 Member States. The most current law for safety of highchairs in the EU is standard EN 14988:2017(EU14988, 2020).<sup>16</sup> It is advised that parents are given this link<sup>14</sup> for further information prior to making a purchase, as with the imposed lockdown is less likely that parents will be able to visit a store.

### Safety and ergonomics of secondhand furniture

Family and friends often help new parents by gifting used furniture. It is important that some fundamental safety questions are answered prior to accepting and using a gift. For example, in the case of a car seat, parents can specifically ask if the car seat has ever been involved

in a motor vehicle accident? And in the case of any baby equipment or furniture, parents can ask if the previous owners were made aware of any recall on the product? Parents can use the information on existing labels to contact the manufacturer and ask if there have been issues reported on that specific product. Check for physical damage on the fabric of the straps, buckles, seat fabric damage or rusting on metal parts. If it's older than seven years, usually new technology has been released and is much better and safer.

Parents are reminded to follow all appropriate sanitation protocols especially during the current COVID-19 pandemic, (washing hands regularly and thoroughly cleaning regularly used surfaces).<sup>1</sup> Based on the recommendations from Centers for Disease Control and Prevention (CDC), Environmental Protection Agency (EPA)-registered surface disinfectant can be utilized safely to clean children's toys and furniture. If bleach is the preferred choice it must be between 5.25%—8.25% sodium hypochlorite. However, parents are cautioned both by manufacturers and CDC that seatbelts and car seats must not be disinfected as the chemical may irritate the safety features, however warm water and soap can be safely utilized.<sup>18</sup>

### Conclusion

In summary, it is paramount that primary clinicians such as chiropractors maintain a good level of communication with the community, especially with new parents or caregivers of young children. It is essential to remind family members of the simple and yet effective way of ergonomically implementing these postural changes and empower them to carry on the essential work of looking after their youngsters and keeping them safe.

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