

Safety & Injury	Summary: Sources were found discussing the injuries and safety practices related to strollers, and infant death as a whole. Most common injuries in strollers and carriers were either from falling or the stroller tipping over (Fowler et al., 2016). Most deaths involving sitting and carrying devices were a result of asphyxiation (Batra et al., 2015). Other injuries are related to fingers getting trapped. Recommendations to prevent injuries include: not leaving the child unattended, using the harness, not hanging bags from the handlebar, not using sitting devices as a place for sleep and to be aware of heat and ventilation. Thoughts: The sources are already somewhat outdated, from around 2015. I wonder if more recent developments or safety campaigns have had an influence on both the amount of and the cause for injuries. In my observations I have found the harness is not used often. Even the website for kinderveiligheid has a picture with two children, both not strapped in. I wonder how much injuries are a result of not using the harness?	Zunjic, A. (2017). Ergonomics for newborns- certain implications and recommendations for parents and designers. <i>ETI Transactions on Ergonomics and Safety</i> Vol. 1 Iss, 2, 1-10.	(Zunjic, 2017)	ERGONOMICS FOR NEWBORNS - CERTAIN IMPLICATIONS AND RECOMMENDATIONS FOR PARENTS AND DESIGNERS	Paper stating to be 'the first in the world' relating application of ergonomics for the needs of newborns. The paper discusses both the design of rooms, objects and strollers	- draws attention to lack of ergonomic studies on newborns - newborn can not recognize blue colour after first week of life - Often recommended room temperature of 18-22 degrees 20-30cm is best for baby to observe object most clearly, at around 2 years, the child achieves visual acuity of an adult person - States that softer mattress allows spinal column to develop correctly? 5900 children (0-4) suffer from stroller-related injuries which require medical treatment - Common mechanisms for injury are: head between cot and handlebar, fingers trapped in folding mech, extra weight which causes overturn (due to load, or standing child) - Recommendations include: 5-point safety belt, brakes, low storage, safety lock for folding, check if meets standard, don't leave baby unattended, do not use pillows - Other recommendations include: choose for flat sleeping surface, be able to switch orientation, allow change handlebar height	Is it supported that a softer mattress allows for better development of the spine? "Choose a stroller that has a foorest because the child will usually use it during growing up" -> I mean what kind of argument/statement is this? (kind of feels like unreliable source)	 	+/-	https://www.jeti.net/jes/2017V1I2/JETI%20TES%20V1%20I2%20I1-10.pdf			
	Batra, E. K., Midgett, J. D., & Moon, R. Y. (2015). Hazards associated with sitting and carrying devices for children two years and younger. <i>The Journal of Pediatrics</i>, 167(1), 183-187.	(Batra et al., 2015)	Hazards Associated With Sitting and Carrying Devices for Children Two Years and Younger	Study reviewing 47 deaths involving sitting and carrying devices with infants <2 years of age	- Often, parents notice child not sleeping well in supine position, and alternative sleeping environments might be used - Other study found children spent a mean time of 5.7h a day in seating devices - two thirds of cases occurred in car seats - in 46 of 47 cases, the cause of death was asphyxiation 8 month year old was sleeping unattended and unfixed in a stroller - Refers to the dangers of using sitting and carrying devices as a place for sleep 89% of car seat deaths were recorded outside of the car 52% of car seats deaths due to strangulation by straps, the other 48% died from positional asphyxia - Parents, when using the car seat outside of the car, often do not use the restraint system, as the child is safe from any car accident	What are the specifics in the car seat cases? How many did use a restraint system? 5 car seats were found on top of the child	+	https://doi.org/10.1016/j.jpeds.2015.03.044					
	Fowler, E., Kobe, C., Roberts, K. J., Collins, C. L., & McKenzie, L. B. (2016). Injuries associated with strollers and carriers among children in the United States, 1990 to 2010. <i>Academic pediatrics</i>, 16(8), 726-733.	(Fowler et al., 2016)	Injuries Associated With Strollers and Carriers Among Children in the United States, 1990 to 2010	Article including analysis of children treated in US emergency departments for stroller- or carrier-related injuries	- in 2010, stroller/carrier related injuries were 2 of the 3 most common nursery product related injuries - Most injuries caused by falls, many leading to traumatic brain injury - Most injuries with children <1 year - The rate decreased from 5.3/10,000 in 1990 to 4.8/10,000 in 2010 - Majority of injuries occurred at home - Most commonly injuries were head, face and mouth - Injuries include: Falling from stroller, Tipped over, Tripped over, caught extremity, collision, entrapment - Yearly recalls of products identify areas of improvement - Preventing tip overs though not hanging heavy purses from the handle, having a wide wheel base, child should not exceed weight limit	What about more recent years? How have newer guidelines and standards influence the designs and amount of injuries?	+/-	https://doi.org/10.1016/j.acap.2016.07.002					
	Kinderveiligheid. (n.d.). De 4 van Veilig Wandelen. https://www.kinderveiligheid.nl/advisen/tips-en-advies/de-4-van-veilig-wandelen	(Kinderveiligheid, n.d.)	De 4 van Veilig Wandelen	Post on their website giving advise on 4 main points for safe use of a stroller	- Second picture is from other page, but shows no use of harness - Never close off the cot entirely (probably because of heat/ventilation) - Do not use cot as a regular sleeping place, as an outside cot would not give enough ventilation through the sides - Move to a seat when baby can sit independently (they mention 6 to 9 months) - Keep baby on a flat surface as long as possible, which is better for the muscle development - Always use the harness to prevent falling/injuries	Interesting to see picture 2, which has been used by the company on the overarching page for 'walking', but both of the children are not strapped in the harness	+/-	https://www.kinderveiligheid.nl/advisen/tips-en-advies/de-4-van-veilig-wandelen					
SIDS	Summary: An important part of infant safety, which requires a separate category, is the Sudden Infant Death Syndrome (SIDS). In the study by Abramson (1944), attention was already called to the excessive number of infants dying from mechanical suffocation. A majority of deaths occurred in prone position (which was thought to be most comfortable) and often due to loose items in sleeping environment. Similar studies have led to campaigns to keep babies in supine position. However, even though the parents are aware of the recommendations, they are not always adhered to (Michalska et al., 2025). Furthermore the recommendations against SIDS have led to newer guidelines to promote 'tummy time' during awake hours to prevent deformation of the head, and promote motor development. Thoughts: I wonder why the mothers in the study of Michalska et al., do not adhere to the safe sleep practices, even though they are aware of them. What would be their reasoning? Furthermore the most interesting part about this category is how the fear, caused by SIDS, has led to preventing the prone position as a whole, resulting in newer guidelines on tummy-time.	Michalska, A., Zmyślina, A., Pogorzelska, J., Mierzw-Molenda, M., Mazur, J., Gładys-Jakubczyk, A., & Zak, M. (2025). Awareness Regarding an Infant's Sleep Environment and Safe Sleep Practices Among Polish Caregivers: A Cross-Sectional Survey. <i>Journal of Clinical Medicine</i>, 14(12), 4295.	(Michalska et al., 2025)	Awareness Regarding an Infant's Sleep Environment and Safe Sleep Practices Among Polish Caregivers: A Cross-Sectional Survey	Article documenting a survey with 451 mothers of <18months infants, assessing their knowledge and sleeping practice	- Most recent update in SIDS recommendations in 2022, containing information about supine position sleeping & tummy time - It is essential to consider sociocultural context in recommendations - Almost all respondents agreed no additional objects should be placed in crib, but 1/3 still did put items in the crib - Stroller was used for 16.7% of sleeping cases 88.9% of mothers were aware that supine is safest sleeping position 12% place their infants on their stomach to sleep 74.5% believed infants should not sleep in same bed as parents, yet 37.76% still do - Mentions campaigns in other countries, which have helped reduce cases of SIDS - However, this study shows that knowledge does not always translate into the proper caregiving practices	Why do the parents not adhere to the recommendations they do know? Would it be more convenient, or would the child not be able to sleep otherwise?	+	https://doi.org/10.3390/jcm14124295				
	Daams, B. (2024). New AAP guidelines to prevent cot death. <i>Baby Ergonomics Newsletter</i>, 1(1). https://www.undesigning.nl/wordpress/wp-content/uploads/2024/09/Baby-Ergonomics-Newsletter-2024-1.pdf	(Daams, 2024a)	New AAP guidelines to prevent cot death	Journal article, showing recommendations and guidelines for preventing cot death	- Associations of US pediatricians has improved recommendations - Dutch annual average of 25 cot deaths (from 200 in 1986) - Other problems have surfaced due to advice to keep supine, including deformed heads, impaired motor development or later posture problems - Child should sleep flat, in supine, without objects in environment - New recommendations pay more attention to tummy time - Do not let baby sleep in a seat (especially <4 months) - Recommendations for industry include to not promote unhealthy situations: No cots with loose bedding, or objects within the sleeping environment, especially not in displays/adverts	Other problems have surfaced, like impaired motor development or posture problems. What would be the cause of these problems? Cant just be from advice to let babies sleep on their back? Perhaps related to the container baby syndrome?	-no picture	+	https://www.undesigning.nl/wordpress/wp-content/uploads/2024/09/Baby-Ergonomics-Newsletter-2024-1.pdf				
	Abramson, H. (1944). Accidental mechanical suffocation in infants. <i>The Journal of Pediatrics</i>, 25(5), 404-413.	(Abramson, 1944)	Accidental mechanical suffocation in infants	Study to call attention to the excessive number of infants under 1 year old, who are dying from mechanical suffocation.	- States that this problem is a sadly neglected field in preventive medicine - Case records of 139 deaths between jan 1939 & dec 1943 69% of deaths were in male babies - Peak of deaths in winter months - In crib deaths (35%), loose pillows or improperly applied blankets were the common lethal agents - In carriage, this were mostly decorative pillows and coverings - Prone position was noted in 68% of the fatalities - Frequent occurrence of smothering after feeding, suggests infant should not be left unguarded too soon after feeding - They believed a prone position would be more comfortable for the baby and would prevent deformation of the skull - Not until 4 or 6th month head an chin raising occurs with some strength	As this study is even from 1944, when did SIDS really become 'a thing'? -> first use was in 1969	+/-	https://doi.org/10.1016/S0022-3476(44)80005-1					
Child posture	Summary: Limited literature can be found on proper posture in strollers. Most was found from Brecht Daams, who calls herself a baby-ergonomist. She states that the strollers themselves are not at fault, but the problem lies in usage (Daams, 2024b). For sleeping, the best position is lying flat. When awake (and the child is able to sit by themselves) the best position is upright, with lower legs vertical. She even argues that horizontal legs while upright could lead to deformation of the spine. Inclined is worst uncomfortable as it resists freedom of movement, necessary for healthy development. Other sources agree that a stroller should have the ability to both be upright and lie flat, to accommodate for the changing needs of the child. Thoughts: Important to consider with these statements that time in stroller should always be limited, which is also mentioned in category <i>motor development</i>. There should be enough breaks for playing and moving around. Furthermore an interesting study was done by Cardon et al. (2004). Even though the participating children were schoolchildren of 8 year olds, it shows how children have a natural urge for movement, instead of constantly maintaining a single position. To expand this category, seating posture in general should be considered.	Daams, B. (2024). Posture in strollers. <i>Baby Ergonomics Newsletter</i>, 1(1). https://www.undesigning.nl/wordpress/wp-content/uploads/2024/09/Baby-Ergonomics-Newsletter-2024-1.pdf	(Daams, 2024b)	Posture in strollers	Journal article, advising the reader on the right and wrong postures of children in strollers	- Adjustment offered by modern strollers allows for unwanted postures - Products themselves not at fault, the problem lies in the usage - For sleeping, or a child which is not yet able to sit, lying flat is best - When awake, the best position (and when child is able to sit by themselves) is upright, with the lower legs vertical - Upright posture promotes healthy development of brain, muscle and bone - Inclined back is uncomfortable as it restricts freedom of movement, which is necessary for healthy development - Children should have sufficient room to move and change posture - Horizontal seat and reclined back causes child to slide down - Legs horizontal and back vertical is uncomfortable and can cause deformation of spine, evidence is found in children who keep their legs hanging off the footrest. - Bumper bar is important for changing posture and interacting - In order to promote healthy behaviour, information should be shared with parent though sales channels and pictures in marketing	What are the sources behind these very direct statements? Why are the postures not comfortable? Why are the children in pictures not in the harness?	++	https://www.undesigning.nl/wordpress/wp-content/uploads/2024/09/Baby-Ergonomics-Newsletter-2024-1.pdf				
	Cardon, G., De Clercq, D., De Bourdeaudhuij, I., & Breithecker, D. (2004). Sitting habits in elementary schoolchildren: a traditional versus a "Moving school". <i>Patient education and counseling</i>, 54(2), 133-142.	(Cardon et al., 2004)	Sitting habits in elementary schoolchildren: a traditional versus a "Moving school"	Study evaluating the differences between a regular classroom for 8 years olds, vs a 'Moving School' concept	- Portable ergonomic observation (PEO) was used - Moving school had furniture adjusted to pupils, leading to a better trunk bend, so less back pain was assumed - Children show a natural urge for movement through tipping chair, or sitting on their leg - No clear conclusions could be drawn on self-reported neck and back pain	Honestly, results make it feel like movement would not be that important for children's back health. But interesting to see the natural urge for children to move, while it does not affect learning or control for the teacher	-	https://doi.org/10.1016/S0738-3991(03)00215-5					
	Aktion Gesunder Rücken (AGR) e.V. (2025). Prams, pushchairs and buggies. https://agr-ev.de/en/certified-products/prams-pushchairs-and-buggies	(AGR, 2025) after mention full name	Prams, pushchairs and buggies	German back health seal/certification	- Child's needs change in time, newborns should lie in pram, later it should be possible to alternate between sitting and lying - adaptable belt system allows freedom of movement - Infants love having an unobstructed view (source?) - Stability and handling is more important than its size - There should always be enough breaks for playing and moving around	Why are only strollers from 3 companies certified? Did the others fail, or never apply in the first place How well known is this seal, does it matter in sales?	+/-	https://agr-ev.de/en/certified-products/prams-pushchairs-and-buggies					

