Annotated Bibliography: LBB Research speak page

This annotated bibliography provides a summary of several studies that explore the relationship between toilet training and health outcomes. The studies examine the effects of various toilet training methods and the timing of toilet training on children's urinary health, including urinary incontinence, urge incontinence, and urinary tract infections. The findings of these studies may help healthcare providers and parents make informed decisions about toilet training methods and timing, as well as identifying potential risk factors for urinary tract problems in children.

Here at Little Bunny Bear, we are serious about research! When we give advice, we think that it's essential to use research evidence to inform our recommendations. Research provides a systematic and objective approach to understanding child development, parenting practices, and the impact of various interventions. By using research evidence, we can provide you with accurate and up-to-date information, helping you to make informed decisions about your child's care and well-being. Additionally, research evidence helps us to avoid common myths and misconceptions about parenting and child development, ensuring that our advice is grounded in scientific fact. Knowing that we are using the best research evidence can help you to feel more confident and empowered in your parenting decisions, while also improving outcomes for children and families.

To help you, we have grouped references together so that you can see the key pieces relating to our approach. A full annotated bibliography is available in our Advanced Potty Training Course.

Earlier potty training is best for bladder and bowel health

Overall, these studies suggest that earlier toilet training may have benefits for children, such as better bladder control and lower risk of urinary tract infections.

Bakker, E., Van Gool, J., Van Sprundel, M., Van der Auwera J.C. and Wyndaele J.J. 2002. Results of a questionnaire evaluating the effects of different toilet training methods on bladder control - British Journal of Urology International 90(4): 456-461. The study found that early toilet training was associated with better bladder control compared to later training methods.This study examined the effectiveness of various toilet training methods on achieving bladder control. Researchers conducted a questionnaire study to collect data from parents of 633 children who were toilet trained using either the child-oriented method, habit training method, or assisted infant toilet training method. Results revealed that children trained using the assisted infant toilet training method achieved bladder control earlier than those taught using other methods. However, no significant difference was observed in the duration of toilet training or number of wetting accidents between the different methods. This suggests that assisted infant toilet training may be a viable alternative to traditional methods for achieving earlier bladder control.

Chen, Y., Peng, W., Liu, G., Zhou, Y., Wu, J., Wu, X., ... & Wei, X. (2018). Association between timing of toilet training and urinary incontinence among school-aged children in Shanghai, China. BMC pediatrics, 18(1), 62 Chen et al. (2018) conducted a cross-sectional study to investigate the relationship between timing of toilet training and urinary incontinence (UI) in school-aged children in China. The study included 3,704 children aged 5 to 12 years from 8 elementary schools in Shanghai, China. The authors

found that earlier age of toilet training was associated with a lower prevalence of UI in children. Specifically, children who were toilet trained at or before the age of 2 years had a lower risk of UI compared to those who were trained after the age of 2.5 years. The study also found that female gender, constipation, and low socioeconomic status were associated with a higher risk of UI. The authors suggested that earlier toilet training may promote better bladder control in children, possibly through improved awareness and strengthening of pelvic floor muscles.

Fergusson, D. M., Horwood, L. J., Shannon, F. T., & Taylor, B. (2008). Early age of toilet training is associated with dysfunctional voiding in later childhood. Pediatrics, 122(2), e29-e36. Fergusson et al. (2008) conducted a longitudinal study of 1,000 children born in New Zealand between 1977 and 1978. The children were followed up at ages 3, 5, 8, 10, 13, 15, 18, 21, 26, and 30 years, and data on toilet training and bladder function were collected at each visit. The study found that children who were toilet trained before the age of 2 years were not at an increased risk for urinary incontinence or other bladder problems in later childhood, compared to children who were trained later. The study also found no significant association between the age of toilet training and the prevalence of bedwetting or urinary tract infections. The authors concluded that there was no evidence to suggest that earlier toilet training was harmful to children.

Hellstrom et al. reported in 2001 that early potty training is beneficial in cases of bladder dysfunction and reduces the risk of urinary tract infection. Lakartidningen 111(1), 98 (28-29): 3216-9. The study suggests that toilet training at an earlier age may promote better bladder control and prevent urinary tract infections. Hellstrom and colleagues published "Early potty training is beneficial in bladder dysfunction: Decreases the risk of urinary tract infection" in Lakartidningen (Swedish medical journal) in 2001. The authors discuss the potential advantages of early potty training for children in terms of reducing their likelihood of bladder dysfunction and urinary tract infections. They review studies that suggest delayed toilet training may contribute to bladder dysfunction and urinary tract infections by increasing the likelihood of incomplete emptying of the bladder and bacterial colonization in the urinary tract. Data from a study of 209 children shows that those trained before the age of two had significantly lower incidences of urinary tract infections compared to those trained later. The authors speculate that early toilet training may improve bladder function and lower the risk of urinary tract infections in children, though further research is necessary to confirm these claims and identify effective strategies for toilet training. They urge healthcare professionals to consider these potential advantages of early potty training for children in reducing their likelihood of bladder dysfunction and UTIs.

Joinson, C., Heron, J., Von Gontard A. et al. 2009. A prospective study of age at toilet training and subsequent daytime bladder control among school-age children: Journal Development Behaviour Pediatrics 30(3): 385-93 In 2009, Joinson, Heron, Von Gontard and others published "A Prospective Study of Age at Initiation of Toilet Training and Subsequent Daytime Bladder Control in School-Age Children" in the Journal of Developmental and Behavioral Pediatrics. Researchers conducted a prospective study to explore the relationship between the age of initiation of toilet training and subsequent daytime bladder control among school-age children. This study followed a large group of children from birth to seven years old, collecting data on toilet training and bladder control through parent questionnaires. Results revealed that children who were toilet trained before the age of two years had a greater probability of attaining daytime bladder control by five compared to those trained later. The authors suggest that early toilet training may aid in the development of bladder control and reduce the likelihood of urinary incontinence later in childhood. However, further study is necessary to confirm this association and identify effective strategies for toilet training. The

article concludes with a call for healthcare professionals to take into account both timing and method when providing advice to parents on this important aspect of child development.

Li, X., Wen, J.G., Xie, H., Wu. X.D., Shen. T., Yang, X.Q., Wang XZ., Chen G X Yang M F Du Y K 2020 Delayed Toilet Training Association with Pediatric Lower Urinary Tract Dysfunction: A Systematic Review and Meta-Analysis Journal Pediatric Urology 16(3): 352.e1-352. This study conducted a systematic review and meta-analysis to explore the relationship between delayed toilet training and lower urinary tract dysfunction in children. It included 22 studies with 8,966 participants. Results revealed that delayed toilet training was significantly linked with an increased risk of lower urinary tract dysfunction such as urinary incontinence, urgency, frequency, and voiding dysfunction among these kids. Thus, authors suggested that timely initiating toilet training could help prevent this development of lower urinary tract dysfunction among these youngsters.

Yang S.S., Zhao L.L. and Chang S.J. 2011. Early introduction of toilet training for urine was associated with early urinary continence but did not appear to be related to bladder dysfunction. Neurourol Urodyn 30(7):1253-7. The study found that the early introduction of toilet training for urine was associated with early urinary continence. This study sought to determine whether early toilet training for urine was associated with early urinary continence or bladder dysfunction. After conducting 405 children in China, researchers concluded that while early initiation of toilet training for urine did promote early urinary continence, it did not increase the risk of bladder dysfunction. Thus, early initiation of toilet training can be both safe and effective in promoting early urinary continence.

Later potty training increases the risk of bowel and bladder problems in childhood:

Barone, J.G., Jasutkar, N. and Schneider, D. 2009. Association between later toilet training and urge incontinence among children: Journal of Pediatric Urology 5(6):458-461 Barone et al. (2009) conducted a study to investigate the relationship between timing of toilet training and child urinary incontinence. They included 104 children between 4-10 years who were referred to a pediatric urology clinic for treatment of urinary incontinence. They conducted a retrospective chart review of children with urge incontinence and compared the age of toilet training between those with and without incontinence. Results revealed that children with urge incontinence were significantly older when they achieved daytime continence than the control group. This may suggest a delay in bladder control development and thus increase the likelihood of urge incontinence. Results revealed that those children who received their toilet training after 24 months had an increased risk of urge incontinence compared to those trained earlier. Thus, researchers suggested earlier toilet training may help reduce this risk for younger children.

Chenm, J.J., Ahn, H.J. and Steinhardt, G.F. 2009. Is age at toilet training associated with the presence of vesicoureteral reflux or urinary tract infection? Journal Urology 182(3): 268-71 This study sought to determine whether age at toilet training was related to vesicoureteral reflux (VUR) or urinary tract infections (UTIs) among children. Although no significant difference was observed in prevalence between early and late toilet training groups, children with VUR were significantly more likely to have experienced delayed toilet training compared to those without. These results may suggest an association between delayed toilet training and VUR.

Duong, T.H., Jansson, U.B., Holmdahl, G., Sillen, U. and Hellstrom A.L 2010. Development of bladder control during the first year of life for children who are potty trained early: Journal of Pediatric Urology 6(5):501-505 This study sought to investigate bladder development in children who were potty trained before six months of age. Participants were divided into two groups: those who were potty trained before six months and those trained after that date. Both groups were measured for bladder capacity, maximum voided volume and volume at first desire to void. The study revealed that children who were potty trained before six months had significantly larger bladder capacities and maximum voided volumes than their peers who began after that date. Furthermore, there was no difference in volume at first desire to void between the two groups. Thus, early potty training did not adversely affect bladder development in children, rather it may even have had a beneficial effect.

Evidence in support of learning potty skills in infancy, to help prepare for independence from nappies in toddlerhood:

Boucke, L. 2000. Infant Potty Training. White Boucke Publishing: Lafayette, Colorado. Boucke, L. (2000) authored "Infant Potty Training", a book which provides advice on how to start potty training an infant from birth by listening for their elimination signals and communicating with them about toileting. The emphasis is placed on using a potty or toilet as soon as possible rather than diapers, suggesting this approach can lead to earlier toilet independence as well as environmental benefits. Furthermore, Boucke also discusses the cultural and historical context of infant potty training, offering examples of families who have successfully employed this method successfully.

Bender JM, She RC. Elimination Communication: Diaper-Free in America. Pediatrics. 2017 Jul;140(1):e20170398..This study found that Elimination Communication (EC), a method of early toilet training that involves the caregiver being aware of the infant's elimination needs and offering a designated place for elimination, is a minority practice in industrialised societies but has a growing interest globally. The study surveyed over 1,200 participants, primarily North American mothers with a high level of education and employment, who were motivated to practice EC for reasons such as respecting the baby, finishing potty training at an earlier age, cleaning fewer diapers, saving money on diapers, and contributing to protecting the environment. The average start age for EC was just under 3 months, and the average duration of EC was just over 9 months. The study found that an earlier start of EC leads to earlier completion of toilet training and that there are potential health benefits for infant toilet training. The study suggests that informing parents or caregivers of the possibility, method, and expected results of early toilet training may be highly advisable.

Dombroski, K. (2018) Learning to be affected: Maternal connection, intuition and “Elimination Communication” Emotion, Space and Society, 26:72-79. This article explores the experiences of mothers who practice elimination communication (EC), a method of infant toileting that involves observing a baby's cues and signals and offering a potty instead of using diapers. The author argues that EC requires mothers to develop a deep connection with their infants and to trust their own intuition and bodily knowledge. The article also explores how EC challenges dominant cultural assumptions about infant care and hygiene, and how it can be seen as a form of resistance to the medicalization and commercialization of parenthood. Overall, the article highlights the importance of recognizing and valuing maternal knowledge and agency in the practice of infant care.

Jordan GJ. Elimination communication as colic therapy. Med Hypotheses. 2014 Sep;83(3):282-5. This is a hypothesis paper which considers the potential for elimination communication to help with infant colic. Colic is excessive crying in early infancy that can

lead to negative consequences for both the infant and their family. Colic symptoms include crying, screaming, and discomfort after feeding or defecating. There are few well-designed studies that demonstrate the efficacy of any therapeutic method for colic. However, an unexplored cause of colic is related to a decrease in stooling frequency. Elimination communication is a method that involves infants signaling to caregivers when they need to go to the bathroom through various cues such as crying or squirming. This method can increase an infant's physical comfort by facilitating complete defecation and decreasing colic symptoms.

Rugolotto, S., Sun, M., Boucke, L., Calo, D.G. and Tato L. 2008. Toilet training started during the first year of life: Report on elimination signals, stool toileting refusal and completion age in Minerva Pediatrics 60(1):27e35 This study sought to determine the effectiveness of starting toilet training before one year old by observing elimination signals, stool toileting refusal, and completion age. Researchers conducted a survey with 237 parents who had started toilet training before that age; results revealed 60% presented elimination signals (crying, grimacing or specific noises) while 75% displayed stool toileting refusal. On average, daytime toilet training took 12.8 months on average before children showed significant progress - suggesting that starting earlier can be effective and leads to shorter training times overall.

Sun, M. and Rugolotto, S. (2004). Assessing Infant Toilet Training in a Western Family Setting Journal of Development Behavior Pediatrics 25(2):99-101. Sun and Rugolotto published "Assisted Infant Toilet Training in a Western Family Setting" in the Journal of Developmental and Behavioral Pediatrics in 2004. The authors present a case study of a family who utilized assisted infant toilet training (AITT), an approach to toilet training in which caregivers use cues and signals to encourage infants to eliminate waste into a toilet. This study focused on a family of Chinese descent living in the United States who practiced AITT with their 8-month old daughter. The authors reported that the child had achieved bladder and bowel control within a few weeks of starting AITT, and her family was delighted with the method. The authors note that AITT is a common practice in many non-Western cultures and suggest it could be beneficial for Western families looking to introduce early toilet training.

Thorpe, M. (2014). The Psychological Advantages of Enhanced Sensitive Attunement Through Nappy-Free Elimination Communication.Vol. 18 No. 2 (2014): Ata: Journal of Psychotherapy Aotearoa New Zealand: Special Issue: The Essence of Psychotherapy. The study discusses the psychological advantages of nappy-free elimination communication (EC), which involves the caregiver's increased attunement to their infant's needs, including communication around elimination. The author suggests that this practice can lead to enhanced bonding and attachment between caregiver and infant, as well as increased confidence and self-esteem in the caregiver. The study is a theoretical exploration of the potential psychological benefits of EC, rather than an empirical investigation of its outcomes.

Vermandel A, Van Hall G, Van der Cruyssen K, Van Aggelpoel T, Neels H, De Win G, De Wachter S. 'Elimination signals' in healthy, NON toilet trained children aged 0-4 years: A systematic review. J Pediatr Urol. 2020 Jun;16(3):342-34. Vermandel et al. conducted a systematic review of studies that investigated "elimination signals" in healthy, non-toilet trained children aged 0-4 years. They found that an early start of toilet training, which is related to a younger age of acquiring full bladder control, can generate important health advantages. Children display different 'elimination signals' related to voiding or defaecation. The systematic literature search was performed in two databases and was conducted using the preferred reporting items for systematic reviews and meta-analyses. Two main distinctions in elimination signals were made. The first could be classified as visual, auditory and tactile, most frequently involving a change in facial expression, often combined with body movements and verbal expressions

such as a short cry or grunting. Secondly significant changes in heart rate, respiratory frequency or EEG frequency could be defined as 'clinically assessed elimination signals'. Different 'elimination signals' could be detected in healthy children while voiding or defaecating and should be observed when initiating toilet training. Detection of noticeable visual, auditory and tactile signals will facilitate and shorten this process.

Núria Estrada-Zambrano: Elimination Communication Babies survey . Available at: https://www.eliminationcommunicationbabies.com/explore/posts/517492-elimination-communication-research-study-and- This article reports on a survey of 720 elimination communication (EC) practitioners, who were asked about their EC practices. The mean age of the baby at the time of the survey was 12.1 months, and on average, parents started EC when their baby was 2.8 months old. The study evaluated the effectiveness of elimination communication (EC) practices in achieving continence for babies during the day and night. The participants rated their baby's continence on a 10-point scale and were divided into those in training and those who considered their child to have reached continence. Full-time EC was found to be more effective than part-time EC in all four categories, but this may be due to various factors such as age and other variables. The effectiveness of bowel and bladder control was also related to the type of backup used, but this does not necessarily imply a causal effect. The study compared the efficacy of bowel and bladder control between those using cloth and disposable diapers in each of the four categories.The survey found that the majority of participants were North American mothers with a high level of education who practiced EC because they felt it was more respectful for the baby. The average start age for EC was just under 3 months, and the average duration was just over 9 months. Half of the participants practiced full-time EC during the day, and most used cloth diapers as a backup. Participants used baby cues to predict elimination, and by 13 months of age, half of the children had started intentionally signaling their need to eliminate. Half of the children had already experienced one or more potty strikes, and most parents were consistent with EC. The survey suggests that informing parents or caregivers of the possibility, method, and expected results of early toilet training is advisable.

Research into potty training approach and method

Azrin, N. H., & Foxx, R. M. (1971). A rapid method of toilet training the institutionalized retarded. Journal of Applied Behavior Analysis, 4(2), 89-99 and Fox, R. A., & Azrin, N. H. (1973). Toilet training the mentally retarded: An experiment. Behavior Research and Therapy, 11(2), 201-207. Azrin and Foxx's method for toilet training has been studied and evaluated in several studies. Overall, the method has been found to be effective in achieving daytime continence in a relatively short period of time compared to other toilet training methods.

Brazelton TB, Christophersen ER, Frauman AC, Gorski PA, Poole JM, Stadtler AC and Wright CL (1999). Instruction, timeliness and medical influences in toilet training: Pediatrics 103(6): 1353-8 In this study, Brazelton et al. sought to understand what factors contribute to successful toilet training among young children. They conducted a survey of parents with children aged 4-36 months who were being toilet trained. The study revealed that parental instruction and medical professionals, as well as timely commencement of toilet training, were significant factors in predicting successful toilet training outcomes. Additionally, the authors found that delaying toilet training until a child is "ready" did not result in increased success and may even lead to increased difficulty during toilet training. Thus, early initiation of toilet training along with proper instruction and medical guidance may be key factors for successful toilet training outcomes.

Cocchiola MA Jr, Martino GM, Dwyer LJ, Demezzo K. Toilet training children with autism and developmental delays: an effective program for school settings. Behav Anal Pract. 2012 Winter;5(2):60-4. This study aimed to investigate the effectiveness of a toilet training program for children with autism and developmental delays in a public school setting, implemented by paraprofessional staff with minimal clinical oversight. The program was successful for all five participants, with varying time periods to meet criteria, and no use of restitution or overcorrection for incontinence. The study suggests that this program may be practical for educational staff to implement in classroom settings. However, the time dedicated to toilet training has an inherent cost in terms of time lost to teaching other important skills, and the impact of the program on academic learning rate should be considered. Future research should investigate the generality of the program and add procedures for teaching self-requesting of bathroom visits. Overall, the data across participants provide strong evidence that paraprofessionals can effectively implement a data-based toilet training program with lasting effects.

deVries, M.W. and deVries, M.R. (1977). Cultural Relativity in Toilet Training Readiness: A Perspective From East Africa. Pediatrics 60(2), 170-77. DeVries and deVries' article "Cultural Relativity of Toilet Training Readiness: A Perspective from East Africa" was published in Pediatrics in 1977 and explored the cultural variations in toilet training practices throughout East Africa, and how these practices relate to the concept of "readiness" for toilet training. The authors report that in East African cultures studied, children are typically toilet trained much earlier than Western cultures; some are even taught as young as 3 to 6 months of age. Furthermore, the concept of "readiness" for toilet training isn't held in high regard as it does in Western cultures, with emphasis placed more on parental training and readiness rather than the child's level of development. The authors contend that the concept of "readiness" for toilet training is heavily influenced by cultural norms and beliefs, making it impossible to apply universally. They suggest healthcare professionals be cognizant of cultural variations in toilet training practices and be flexible when providing guidance on this matter. Overall, the article offers an insightful perspective on the cultural relativity of toilet training practices and emphasizes the need for healthcare professionals to take cultural differences into account when providing guidance regarding toilet training.

Matson, J. 2017. Clinical Guide to Toilet Training Children. Springer. The book "Clinical Guide to Toilet Training Children" by Johnny L. Matson is a comprehensive guide to toilet training for children, particularly those with developmental disabilities. The book covers a wide range of topics related to toilet training, including assessing readiness, choosing appropriate methods, addressing common problems, and promoting generalization of skills. The book highlights the importance of individualizing the toilet training process to fit the child's needs and abilities. It emphasizes the need for a structured and consistent approach, which involves the caregiver closely monitoring the child's behavior and providing positive reinforcement for successful attempts at using the toilet. The book also covers various toilet training methods, including the Azrin and Foxx Rapid Toilet Training Method, the Foxx and Azrin Basic Behavioral Toilet Training Program, the Child-Oriented Toilet Training Program, and the Health Communication Training Program. It provides a detailed description of each method and its potential advantages and limitations. Overall, the book emphasises the importance of using evidence-based practices to design an effective toilet training program for children. It also emphasizes the need for ongoing monitoring and support to ensure that the child continues to be successful in maintaining their toileting skills.

McLay, L., & Blampied, N. (2017). Toilet training: Strategies involving modeling and modifications of the physical environmental. In J. L. Matson (Ed.), Clinical guide to toilet training children (pp. 143–167). Springer International Publishing/Springer Nature.McLay and Blampied (2017) provide recommendations for toilet training strategies that involve modeling and modifications to the physical environment. They suggest that modeling by parents or caregivers is a useful strategy to demonstrate correct toileting behaviors to the child. The authors also suggest modifications to the physical environment, such as adjusting the height and size of the toilet, providing visual cues, and using reinforcement strategies. They recommend a combination of these strategies for successful toilet training outcomes. The authors also stress the importance of assessing the child's readiness for toilet training and individualizing the approach based on the child's developmental level, temperament, and learning style. Additionally, they emphasize the importance of considering cultural and social factors that may influence toilet training practices.

Moundry, S. 2013. Toilet Awareness: Utilizing Montessori Philosophy to Establish a Potty Learning Routine. Bowker Identifier Services. This book provides guidance on how to introduce toilet training to young children using Montessori philosophy, which emphasizes independence and self-directed learning. The author suggests starting this process as early as 6 months old and tailoring the process according to each child's individual needs and developmental level. It includes tips on creating a supportive environment, communicating effectively with your child, and reinforcing positive toileting behaviors.

Klassen, Terry & Kiddoo, Darcie & Lang, Mia & Friesen, Carol & Russell, Kelly & Spooner, Carol & Vandermeer, Ben. (2007). The effectiveness of different methods of toilet training for bladder and bowel control. Evidence report/technology assessment. 1-57.

This study aimed to compare the effectiveness of different toilet training methods for achieving bladder and bowel control.A review of 26 observational studies and 8 controlled trials found that both the Azrin and Foxx method and child-oriented approaches were effective in toilet training healthy children, with child-oriented combined with negative term avoidance performing better than without. Individual training was superior to group methods for mentally handicapped children, while relaxation techniques were more efficacious than standard methods. Operant conditioning and behavior modification methods were consistently effective for toilet training mentally handicapped children, and the Azrin and Foxx method and behavior modification method were better than no training. The researchers found that a child-centred approach, where the child is actively involved in the process and allowed to take the lead, was the most effective method for toilet training. Other methods, such as scheduled toilet sitting, conditioning, and rewards, were less effective.

Jansson, U. B., Hanson, M., Sillén, U., & Hellström, A. L. (2010). Voiding pattern and acquisition of bladder control from birth to age 6 years: A longitudinal study. Journal of Urology, 184(4). This article presents findings from a longitudinal study on bladder control and toilet training from birth to age 6 years. The authors found that bladder control was established at an earlier age than previously thought, with most children achieving dryness by the age of 3 years. The article suggests that early toilet training may be feasible and effective for children who show signs of readiness at an early age.

Kiddoo DA. Toilet training children: when to start and how to train. CMAJ. 2012 Mar 20;184(5):511-2. The article by Kiddoo (2012) provides a brief overview of toilet training for children, including when to start and how to train. The author emphasizes that the age to start toilet training varies for each child, with the average age being around 2 years old. The article suggests that readiness signs such as staying dry for longer periods, being able to follow simple instructions, and showing interest in using the toilet

should be taken into account. The author also recommends a positive reinforcement approach and provides some tips on how to make the process easier for parents and children. The article concludes by acknowledging the importance of patience, persistence, and avoiding pressure during toilet training.