**Rethinking the Term Breech Trial:**

**Unblack-boxing the Breech Management Controversy**

If obstetricians were asked why breech deliveries are so rarely performed in the United States, they would likely answer by first referring to the publication of the Term Breech Trial (TBT) results in 2000. Led by a Canadian team and headed by the esteemed Dr. Mary Hannah, the TBT study was a large-scale randomized control trial (RCT) that included 2,088 births at 121 medical centers in 26 countries, and ranked highly on the evidence-based medicine (EBT) hierarchy (1b). The goal of the study was to definitively determine whether cesarean sections (CSs) or vaginal breech deliveries (VBDs) were safer in cases of breech presentation. Study results so unequivocally favored cesarean sections that the study was halted midway due to ethical concerns (Lawson 2012), and its interim conclusions were published in 2000 in the *The Lancet* (Hannah et al. 2000). The TBT had an immediate and powerful impact on the fields of obstetrics and gynecology; months after publication of the study results, the American College of Obstetrics and Gynecology (ACOG) declared:[[1]](#footnote-1)

As a result of the findings of the study, planned vaginal delivery of a term singleton breech may no longer be appropriate. Patients with a persistent breech presentation at term in a singleton gestation should undergo a planned cesarean delivery. If the patient refuses a planned cesarean delivery, informed consent should be obtained and should be documented (ACOG, Committee Opinion No. 256 2001).

Many claim that the TBT accelerated the trend of CS deliveries for breech presentations “almost to the point of no return” (Lawson 2012). The overall policy of elective CS in breech presentations, along with their relative rarity (3–4% of term births), created a state in which “both the skills for and the willingness to perform VBD have virtually vanished from delivery wards in the western world, and a reversal of this situation is very unlikely” (Glezerman 2012[[2]](#footnote-2)). Despite criticism of the TBT study,[[3]](#footnote-3) which led obstetrics associations to moderate their recommendations (ACOG 2006), the TBT had already “doomed” vaginal breech births, and the skills and knowledge required to perform them have since largely been lost.

The TBT’s cardinal impact, prompting the field of obstetrics to abandon and largely forget vaginal birthing skills, is staggering and extraordinary. Did the TBT, a single study, actually have such an overwhelming and swift impact as to “doom” VBDs? This current study challenges that accepted narrative and argues that, although the TBT was undoubtedly a pivotal landmark in the history of breech births, it should not be regarded as the sole impetus behind the dramatic change in breech birth management. Rather, these changes emerged from several processes dating back to the mid-twentieth century, which actually prompted the need for such a massive study and may have contributed to the TBT’s pervasive impact and the elimination of VBDs.

**Opening the Black Box behind TBT**

Several literature reviews, particularly in the early 1990s, examined breech presentation management (Cheng and Hannah, 1994; Hofmeyr….) and compared study findings over the years. The picture that emerges from this is of a long-standing, persistent controversy between those who considered CS to yield a considerable advantage in birth outcomes, and those who found no significant differences in VBD and CS outcomes – the very controversy the TBT sought to settle. However, it is hard to understand why the TBT had such an oversized influence on breech deliveries, and why such a massive study was even necessary in the first place. What were the origins of the controversy and how did it develop? And when did breech presentations become perceived as high-risk events that required management?

To “open the black box” behind the TBT and understand the processes that prompted the study and its subsequent unprecedented, near-universal acceptance, the controversy’s historical, technological and clinical contexts must first be examined. An analysis of the related literature reveals a complex process beginning in the 1950s that shaped the clinical conception that VBDs were hazardous (See Part 1). As a result, mechanisms were developed to restrict, monitor and prevent them, at the same time that attitudes toward CSs and their integration into standard clinical practice in breech presentation were becoming more liberal. By the 1970s, these processes had helped to create a clinical environment in which the majority of obstetrics wards in North America had abandoned VBD, and the related techniques were forgotten over the following generations (See Part 2). The “controversy” over the management of breech presentation, which the TBT was supposed to settle, did not emerge until the 1980s (See Part 3), after prominent health organizations voiced concerns over the increasing prevalence of CS and their potential repercussions. Thus, a gap arose between growing doubts over CSs’ ability to improve breech outcomes and a reality in which VBDs were almost nonexistent due to a combination of clinical norms, the medico-legal atmosphere and the new generation of obstetricians’ lack of familiarity with the skills and knowledge required for breech delivery. It was in this climate, boosted by the importance attributed to RCTs in the 1990s in determining treatment policy, that the TBT initiative was perceived as the “final chance” before VBDs disappeared completely.

**PART 1**

**Origins of the Controversy: Establishing the Hazards Notion of Breech Delivery in the 1950s–1960s**

One of the first notable landmarks in modern medical-scientific discourse on the management of breech births was the American obstetrician Ralph C. Wright’s call to perform elective CSs in all breech presentations at term (Wright, 1959).[[4]](#footnote-4) At that time, cesarean sections were still relatively rare and Wright’s[[5]](#footnote-5) recommendation was perceived as trailblazing, even radical. However, as detailed below, it reflected several prevailing processes occurring in obstetrics at that time, including implementing a more scientific and interventional approach to childbirth, prioritizing the reduction of infant mortality rates, and promoting cesarean sections as safe and promising procedures.

**Background: IMR Reduction and a New Generation in Obstetrics**

Wright belonged to a new generation of obstetricians who supported a more scientific, interventional approach to childbirth. As many obstetricians shifted to working in hospitals as the fields of obstetrics and gynecology became unified in the 1930s, and as home births shifted to hospitalized births, conditions were ideal for the systematic measurement of pregnancy, fetal and childbirth metrics. The concentration of births in a single location, the ability to monitor delivery conditions, and greater access to technology all helped to advance more systematic knowledge about pregnancy and childbirth, and led to the development of modern metrics, technologies, and standards in diagnostics and obstetrics.

Concomitantly, in the field of modern obstetrics, there was increasing agreement that childbirth was a high-risk event requiring active intervention. One factor contributing to this viewpoint was the concerted effort in the 1950s to reduce infant mortality rates (IMR) among children under one-year-old, most of whom were dying of childbirth complications (NIH, 1980).[[6]](#footnote-6) Thus, many resources were invested in improving labor outcomes by opening infant intensive care units, improving maternal and fetal medicine and neonatology, and prioritizing the baby’s life over the mother’s in childbirth.[[7]](#footnote-7) The documentation of the causes of mortality and morbidity (M&M) in childbirth became one of obstetrics’ primary goals (Eastman 1956, 2) and spurred extensive research on the topic (Kauppila 1975; Thompson 1960).[[8]](#footnote-8) In this context, a more interventionist approach began to evolve, which was reflected in, inter alia, an increasing number of cesarean sections (NIH, 1980).

Cesarean sections were not a new procedure, but, having been considered “more risk than remedy” until the latter half of the 20th century (Wolf 2018), had rarely been performed. From the mid-1940s, with the increased use of penicillin, improvements in blood transfusions and hospitalization quality, and advances in diagnostic technology (such as x-ray pelvimetry), cesarean sections began to be performed somewhat more frequently. As more obstetricians gained surgical experience with cesarean sections, they acquired greater skills and knowledge, trained medical staff and improved surgical conditions (Harris and Nessim 1959). Moreover, empirical findings in the 1950s linked more liberal attitudes toward performing cesarean sections with lower IMRs in the United States, which helped alleviate lingering doubts about the procedure. Obstetricians began to perceive cesarean sections as “the greatest good of the entire group,” meaning the society (note, in Harris and Nessim 1959). Developments in the 1950s, including the collection of data regarding childbirth, a growing acknowledgement that childbirth was a high-risk event, the increasingly interventionist approach to childbirth, and the promotion of CS as a new, safe and modern standard-of-care for deliveries throughout the 1950s, created an environment in which breech deliveries began to attract the attention of researchers in the field.

**Liberalization of Attitudes Regarding Performing CS and the Establishment of the Breech Delivery Hazard as Scientific Fact**

Breech presentation had always been considered an abnormal presentation that required knowledge of physical techniques and instruments (such as forceps) and was associated with high morbidity and mortality (M&M) rates, especially due to its prevalence among preterm deliveries. As part of the mission to lower IMR in the United States, a wave of research was conducted in the 1950s that sought to examine empirically whether breech deliveries posed a higher risk than cephalic (standard) deliveries[[9]](#footnote-9) (Calkins 1955; Hall and Kohl 1956). Simultaneously, “to do or not to do a cesarean section [in breech]” became a central question in obstetrics (Harris and Nessim 1956). Several studies conducted empirical comparisons of infant M&M in CSs and VBDs, and results indicated better results with CSs (Goethals 1956; Hall and Kohl 1956; Harris and Nessim 1956; Wilcox 1949).

Inspired by these studies, in 1959, Ralph C. Wright sought to establish[[10]](#footnote-10) a new approach to breech deliveries, acknowledging them as pathological events posing unique and unpredictable risks that lacked effective responses or treatments. Recognizing CS as the safest alternative, he sought to liberalize physicians’ attitudes toward performing CSs for breech births:

If cesarean section in breech presentation is *safer* for the baby of a 35-year-old primigravida, is it not also *safer* for the baby of a 21-year-old primigravida? If cesarean section is safer for the baby whose mother had a previous still-birth, is it not also *safer* for the baby of a multiparous patient with normal obstetric history? (Wright 1959).[[11]](#footnote-11)

Wright’s recommendation was the first to promote a treatment policy in which all breech presentations at term would be delivered by elective cesarean section (ECS) (Wright 1959), and it garnered a great deal of attention in the obstetrics community, as many obstetricians (for example, Johnson 1964; MacArthur 1964; Varner 1962)[[12]](#footnote-12) considered Wright’s approach too radical. CS was still viewed as risky for mothers (Wright 1959), who, it was believed, could become “obstetrical cripples” (Ed. note in Harris and Nessim 1956), fated to repeat surgeries in future deliveries. Even the most ardent supporters of liberalizing the attitudes toward performing CSs in breech presentations[[13]](#footnote-13) recognized that imposing a blanket policy of ECS for breech presentations was a complex mission that would require extensive resources (for example, appropriately equipped operating rooms, anesthesia, nursing staff, and more), which were rather limited at the time (Grant, discussion in MacArthur 1964; Godard, discussion in Patterson et al. 1967).

In the 1960s, as attitudes about performing CSs continued to be liberalized, concern grew over declining expertise among obstetricians in breech maneuvers (Wulff, discussion in Patterson et al. 1967), and some argued for the investment of more resources in improving VBD results rather than comprehensive adoption of CS (Grant, discussion in Macarthur 1964). Despite criticism, in the 15 years following Wright’s recommendations, support for liberalizing attitudes toward performing CSs as the primary tool for reducing M&M in breech deliveries increased (Smale 1976). Several medical centers adopted performance of CSs in breech births as policy (Gibbs, discussion in Patterson et al. 1967), and CS rates rose steadily (Benson 1972).

Simultaneously, Wright’s statement expanded the scope of discourse and sparked further research into the risks associated with breech deliveries. Inspired by Wright’s work, obstetricians set out “to study the intrinsic risk of breech delivery” (Potter et al. 1960; see also Jurado and Millel 1968; and others). Breech deliveries, which had always been considered “on the borderline between obstetric physiology and pathology” (Williamson, discussion in Varner 1962) increasingly appeared to be hazardous, and more researchers sought empirical data to confirm for this observation (Bernerds et al. 1965). In the 1970s, the “breech delivery hazard”notion transitioned from hypothesis to “scientific fact*,*”[[14]](#footnote-14)with the entire medical community unanimously acknowledging that breech deliveries were risky. This recognition of the clear risks of breech delivery served as a basic assumption in later studies[[15]](#footnote-15) (for example, Rovinsky et al. 1973; Lyons and Papins 1978; and others).[[16]](#footnote-16) In this context, it was possible and even essential to promote CS in breech presentations and limit VBD accordingly.

**PART 2**

**Management of Breech Deliveries and the Decline of VBD in the 1960s**–**1970s**

New approaches to breech delivery adopted during the 1950s were consolidated during the 1960s and 1970s. Although infant mortality rates declined steadily,[[17]](#footnote-17) concerns over the risks of breech delivery, which were now considered scientific fact, were not alleviated. Instead, specific pathologies related to breech delivery, such as hip pathologies, brachial plexus, umbilical cord pathologies, anomalies of the uterus, and other pathologies gained prominence in the discourse.[[18]](#footnote-18)

Likewise, the central debate over proper management of breech deliveries, which expanded in these years,[[19]](#footnote-19) sought to address risks by suggesting methods and techniques to mitigate the pathologies associated with breech presentation. As attitudes toward performing CSs in breech births became more liberal, the debate focused on ways to minimize VBD by reducing the conditions that permitted VBD, and on increasing monitoring and prevention of breech presentation, while at the same time offering CS as a natural alternative. Meanwhile, the 1970s witnessed a complete reversal in attitudes toward CS and VBD (Gimovsky et al. 1980; Lyons and Papins 1978), with surgeries becoming standard protocol in many hospitals, and the choice of vaginal birth becoming less and less self-evident.

**Broadening the Indications for CS: Limiting VBD**

One indication that CS had become established as the therapeutic standard in breech deliveries was the expansion of conditions considered to be indications for ECS. If in the 1950s physicians tended to refer cases with “high priority baby,” “elderly primigravida,” or “poor obstetrics history” for ECSs (Wright 1959). In the 1970s, with research increasingly apprising physicians about the growing list of pathologies and risk factors associated with breech births, including primigravida (Hester, discussion in Brenner et al.), fetopelvic disproportion (Fianu 1976; Rovinsky et al. 1973), fetal distress, uterine dysfunction, previous myomectomy, placenta previa, floating station, involuntary infertility, pelvic contracture, abruptio placentae, tumor previa (Collea et al. 1978), prematurity (Golden and Nelson 1977), diabetes mellitus (Collea et al. 1978; Rovinsky et al. 1973) and more. The expanding list of indications for CS in effect limited the conditions that permitted VBD, and surgeries soon superseded vaginal births. Concurrently, repeat surgery was established as one of the major indications for CS, and nearly a quarter of cases referred for CS in breech presentation in the 1970s were repeat surgeries (Rovinsky et al. 1973) as a result of the popular assumption that “once caesarean, always caesarean.”[[20]](#footnote-20)

In addition to expanding the list of indications, scoring systems developed in the 1960s and 1970s as tools for breech management decisions helped establish CS as the clinical standard. The indices aimed to eliminate errors in obstetricians’ subjective judgment and provide a simple, immediate, and empirically-based numerical indicator for deciding whether to refer a breech presentation to CS or VBD (Bird and McElin 1975; Confino et al. 1985; Rovinsky 1973 ), without needlessly wasting time on debating each case, which could ultimately cost lives (Zatuchni and Andros 1967). The Zatuchni and Andros Scoring System (Fig. 1), developed in 1965, weighed various risk factors in breech deliveries, such as parity, age of gestation, fetal weight and presentation on a numerical scale of 0–9 (Zatuchni and Andros 1965, 1967). According to this scale, pregnancies were categorized as low-score deliveries (0–3), which were considered high risk and were automatically referred to ECS, and high-score deliveries (4–9), which were considered low risk and could be performed as VBDs. Likewise, the Feto-Pelvic Breech Index presented by Swedish doctor Hans Ohlsén (1975) categorized cases as Normal (score 0–4) and Complicated (score 5–9) deliveries, which would then be referred to elective surgery, depending on fetal and pelvic measurements.[[21]](#footnote-21)

תמונה שמכילה צילום מסך

התיאור נוצר באופן אוטומטי

FIGURE 1. The Zatuchni and Andros Scoring System for management of breech delivery, 1965, 1967

The use of generalized categories of high risk/complicated versus low risk/normal births in the indices established a numerical cut-off that helped quantify clinical recommendations, while also institutionalizing CS as a clinical standard for all high-risk births rather than a singular response for specific birth conditions. The view that CS was safer than VBD brought the index authors and subsequent researchers to further expand the list of indications for CS,[[22]](#footnote-22) to restrict the cut-off for VBD,[[23]](#footnote-23) and to even explicitly recommended significantly increasing the rate of CS.[[24]](#footnote-24)

Despite the indices’ limited ability to faithfully reflect birth conditions )O’Leary, discussion in Brid and McElin 1975) or improve outcomes (Smale et al. 1976), and despite the opposition from obstetricians who relied primarily on their own professional evaluations (Brenner et al. 1974; Confino et al. 1985;), scoring systems were adopted as the clinical standard across the United States (Bird and McElin 1975). The implementation of scoring systems soon increased CS rates, particularly the rate of elective surgeries (Westin 1977),[[25]](#footnote-25) sometimes up to three times more than the original recommendations (O’Leary, discussion in Brid and McElin, 1975).

The expansion of indications and conditions for CS contributed to the growing perception of VBD as a complex procedure that should be limited to “optimal” conditions, as is evident in commentary by the editor of *Obstetrics and Gynecology*:[[26]](#footnote-26)

I believe that the danger to the infant who is in a breech position is so great that one should search thoroughly for reasons for electing vaginal delivery instead of searching for reasons performing a cesarean section. If all factors surrounding a patient with a term breech presentation are favorable, we usually *permit* [emphasis added] vaginal delivery. If, however, the slightest deviation from a normal pregnancy or labor exists, we quickly switch to cesarean section. (Ed. note, in Tank et al. 1971).

**Prevention of Breech Births: The Rise of ECV/Developments in ECV**

Another method of reducing risk in breech delivery was the attempt to prevent breech presentation by external cephalic version (ECV) of the fetus in the later stages of pregnancy.[[27]](#footnote-27) Although ECV maneuvers were not new, and even merited mention in Hippocrates’ writings (Fassender 1964), the practice was not endorsed by modern obstetrics. The combination of complex skills that verged on artistry (McArthur 1964; Ranney 1973; Ylikorkala and Hartikainen-Sorri 1997), together with the high risk to the fetus (Bradley-Watson 1975) and low success rates,[[28]](#footnote-28) led many hospitals to prohibit ECV on their wards (Bradley 1973; Flanagan 1982) and exclude it from obstetrical training programs (Paalman, discussion in Ranney 1973).

However, as concerns over breech deliveries grew, more recommendations were made to encourage a policy of ECV for all breech presentations (Bradley-Watson 1975; Hibbard and Schumann 1973; Ranney 1973; Ylikorkala and Hartikainen-Sorri 1977; and others). This trend escalated when new versions of techniques, originating in Germany, were introduced, involving the use of tocolytic drugs to ease contractions, simplifying the procedure, and enabling its performance in the later weeks of pregnancy (after week 37), when fewer fetuses would return to breech position before term (Salin and Müller-Holve 1975). Together with the precise, immediate and detailed diagnostics made possible by ultrasound technology and fetal heart monitoring, ECV became simpler, safer, and more efficient (Van-Dorsten et al. 1981; Westin 1977; Ylikorkala and Hartikainen-Sorri 1977) and was integrated into breech management protocols (Hofmeyr 1983; Van-Dorsten et al. 1981). However, while ECV never became a leading alternative in breech births, the expansion and institutionalization of ECV contributed to reducing VBD frequency in the clinical setting.

**Reframing VBD: Too Challenging for the “Average” Obstetrician?**

In the late 1950s, along with growing recognition that CS could be a viable substitute for VBD, obstetricians began to view the physical and instrumental techniques (such as the use of forceps) used in breech deliveries as outdated and potentially dangerous, and came to believe that they “should surely be forgotten today in favor of section…” (Eastman, Ed. note, in Harris and Nessim 1959). The generation of obstetricians who still took pride in their ability to manage difficult vaginal births and avoid cesarean sections came to be perceived as “old-school” (ibid). As the pathological discourse on breech births expanded, this outlook took on another dimension. With more and more studies highlighting the challenges inherent in acquiring and mastering critical skills for successful delivery in cases of complex presentation due to the relative rarity of breech births, the possibility of physicians acquiring the requisite expertise to perform VBDs increasingly came came to be considered unlikely: "Only the very busiest obstetricians will deliver 200 babies annually over any long period of years, say 15 or 20… he may then deliver a maximum total of 1.2 per cent or 48 primigravida breech deliveries during his lifetime” (Wulff, discussion in Patterson et al. 1967). The fact that vaginal births were, in a sense, at a “point of no return” (Varner 1962) exacerbated the problem. From the moment the vaginal delivery began, it was no longer possible to choose an alternative procedure if something went wrong, as doing so would require full command of the necessary knowledge and skills (ibid). As CS became the clinical standard for breech deliveries and young obstetricians observed fewer and fewer VBDs (Miller, discussion in Collea et al. 1978), the claim that VBDs were difficult for the “average physician” (Brenner et al. 1974) and could only be performed by a few experts gained traction (Ed. note, in Tank et al. 1971).

**Tightening Supervision**

During the 1960s, and even more so in the 1970s, with more and more experts coming to believe that the majority of doctors could not adequately perform VBDs, it was increasingly urged that supervision by experienced, senior physicians be required in VBDs: “Consultant is required in all cases of breech presentation and consultant should be present and assist at the time of delivery” (Varner 1962; see also Rovinsky et al. 1973). Monitoring of childbirth also increased, and the recommendation proliferated that VBD be performed only as a “trial of labor,”[[29]](#footnote-29) which entailed close supervision of a delivery so any deviation from the normal course could be immediately referred to CS, which was considered the safest and most prudent method (Benson et al. 1972; Brenner et al. 1974; Ed. note in Tank et al. 1971; Gerret, discussion in Varner 1962; Hester, discussion in Brenner et al. 1974; Wolter et al. 1964; and more).

Demands to tighten supervision in childbirth and involve a senior physician in every breech delivery led to a problematic clinical situation, as most births were customarily not carried out by experts at all, but rather by residents with little experience, who constituted the majority of manpower on the wards.[[30]](#footnote-30) As a result, many cases for which VBD may have been appropriate were nonetheless referred for CS (Kauppila 1975). The demand for supervision also contributed to minimizing VBDs in the clinical setting, and the lack of VBD expertise led to a new class of risk factors in breech births arising from insufficient experience, such as poor assistance, inadequate anaesthesia, and faulty delivery technique” (Jonson 1970). Disastrous outcomes exacerbated young doctors’ existing fears of vaginal deliveries, especially since CS was thought to be the safest and simplest option.

**The Medico-Legal Atmosphere**

One factor that undoubtedly intensified young doctors’ fears and reticence to perform VBDs was the increasing involvement of legal entities and insurance companies in treatment decisions (McNulty discussion in Hibbard 1973; Walker, discussion in Hibbard 1973). The high-risk nature of breech deliveries, the unpredictability of vaginal deliveries, and the numerous studies that supported CS liberalization led medico-legal entities to prefer CS, which they had come to view as a conservative, predictable, and safe option. One manifestation of this preference was the demand that women designated for VBD sign consent forms that detailed the risks inherent in the procedure and noted that surgery was a preferable option. This requirement limited physicians’ autonomy in deciding on treatment and made them feel that they were “being painted into a corner by plaintiffs’ bar insofar as breech presentation is concerned” (McCall, discussion in Collea et al. 1978). Medical institutions’ and doctors’ fear of malpractice lawsuits and insurance indemnification pressured them into adhering to protocols and scoring systems (Confino et al. 1985) and into the overuse of diagnostic technologies (Campbell 1976),[[31]](#footnote-31) which increased referrals to CSs. Accordingly, as medico-legal concerns gained more prominence in clinical decisions, even obstetricians inclined to deliver breech babies by VBD became more reluctant about opting for VBD.

In the mid-1970s, breech deliveries were viewed very differently than they had been two decades earlier. Some 60–90% of breech presentations were delivered by CS in the United States and Canada (Gimovsky et al. 1983; Green et al. 1982; NIH Consensus Statement 1980), which reflected a significant increase in just a few years.[[32]](#footnote-32) At the same time, there was a general increase in CS rates in many western countries, especially in North America, which reflected even wider developments in the 1970s, such as an increase in the number of doctors, the introduction of health insurance, and improved early detection of childbirth risk factors (NIH 1980a). However, breech deliveries were considered extreme cases and unequivocal indications for CS (ibid).

As detailed in this Part, increased CS rates for breech presentation were accompanied by a vigorous medical-scientific debate, which not only consolidated the pathological approach towards breech deliveries, but also offered CS as an appropriate, safer and simpler alternative. At the same time, demands escalated to limit the conditions for VBD, tighten the supervision of obstetric staff and delivery, and prevent breech presentation by endorsing and improving external version. In the clinical setting, VBDs were rarely performed, and if they were, they required patients’ signatures on consent forms and generated fears of malpractice lawsuits among doctors. As discussed in the next Part, one of the main repercussions of this situation was that by the early 1970s, VBD expertise was no longer imparted to new generations of obstetricians. Young doctors, who had been trained to perform CSs in breech presentations, were afraid to perform VBDs due to their questionable efficiency and safety and their uncontrolled nature. When the “aura” around CS began to fade in the early 1980s, this became a critical issue in the discourse on breech management.

**PART 3**

**1980s**–**1990s: Birth of a Controversy and its Resolution**

Over the past 25 years, you have done a magnificent job of convincing those in practice, the legal profession and the public that the correct way to deliver a breech presentation is by cesarean section. I submit to you that it will take another 25 years to turn that mind set around … It is not possible to change the attitudes of the general population as fast as academicians can produce papers with new concepts (James Caillouette, Discussion in Flanagan et al. 1987).

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Although CS was largely adopted as the protocol for breech deliveries during the 1970s, some still criticized the procedure (for example, Jacobs, discussion in Brenner et al. 1974). Criticism peaked in the mid-1970s, after several large health organizations generated public concern over CS, raising questions over the health, ethical and financial implications of rising CS rates around the world. As Caillouette notes (ibid.), these questions permeated the debate on breech management and caused a growing disparity between the doubts expressed in the literature on CS efficacy and safety and the clinical reality that had already been established in obstetric wards. This section describes how this disparity led to a controversy around breech deliveries, which demanded a decisive, scientific, and qualitative resolution of the question of whether CS of VBD was the safer procedure.

***Criticism***

In the mid-1970s, soaring CS rates in the United States and throughout the western world sparked public concern which needed to be addressed (NIH 1980a). In 1977, as part of the Consensus Development Process, the NIH (and, later, the WHO, SOCG, and others) established interdisciplinary research teams to assess CS rates and examine their contribution to reducing maternal and infant M&M, as well as the financial, social, psychological, and legal implications of these trends. (NIH 1980a, 8).[[33]](#footnote-33) The report, presented in 1980 to both professional stakeholders and the public at large, recommended extensive measures to reduce CS rates, which the report’s authors deemed excessive.[[34]](#footnote-34) Similar recommendations were presented in several WHO publications (WHO 1985a; WHO 1985b; WHO 1985c; Chalmers 1992), the most prominent of which called for reducing CS rates to 10–15% worldwide (WHO 1985c). Breech deliveries, which were a leading indication for CS (NIH 1980a, 1980b), were discussed in various reports and, for the first time, reservations regarding performing CSs in breech deliveries were expressed.[[35]](#footnote-35) Various reports recommended reinstating VBD as the clinical default and avoiding surgery “unless it can be shown to be justified” (SOGC 1986),[[36]](#footnote-36) and simultaneously urged the advancement of research on external cephalic version as a preventative procedure.

Such reports had little effect on CS rates, which continued to climb throughout the 1980s and 1990s (Kosecoff et al. 1987; Myers and Gleicher 1987), but they did lay the foundation for a new medical-scientific debate that aimed to critically examine the efficiency, safety, and cost to taxpayers of CS, and to promote a policy of vaginal birth after cesarean (VBAC).[[37]](#footnote-37) Concomitantly, a myriad of publications discussed the exploration and promotion of external version to minimize the risks that had been associated with VBD in previous decades, and now with CS[[38]](#footnote-38) as well, an approach that was partially adopted at hospitals across the United States and elsewhere (Amon et al. 1988).

This new, more critical attitude permeated the medical-scientific discourse on breech delivery management, which was slowly changing. Opinions about the abdominal route grew more critical and disjointed, and a growing body of professional literature expressed doubts regarding the previous decade’s prevailing assumptions and conclusions. Many authors prefaced their papers with expressions of deep concern over high CS rates in breech deliveries (for example, Collea et al. 1978, 1980; Gimovsky 1980, 1983; O’Leary 1979; Russel 1982; Vndorsten et al. 1981; and more). Some speculated on the reliability of claims that attributed a significant M&M reduction in breech deliveries to CS (Anderman et al. 1984; Fleming 1980; Green et al. 1983; Myer and Gleicher 1987). Others advised investigating the negative effects of surgery on mothers (Collea et al. 1798, 1980; Russel, discussion in Bowes et al. 1979). Meanwhile, a cautious recommendation was made that vaginal deliveries should be performed according to protocols and be monitored technologically (Bowes et al. 1979; Collea et al. 1978, 1980; Gimovsky 1983). Some even called to reduce CS in breech cases to 20%, as had been the rate prior to the 1970s (Green et al. 1982; Meyr and Gleicher 1978;). Although leading authorities in the field of obstetrics still considered CS the most efficient and safe option in breech deliveries (for example, Ed. note, Collea et al. 1981), it was clear in the professional literature that this view was no longer unanimous.

***The Controversy***

Notwithstanding the criticism of the use of CS in breech deliveries in the professional literature during the 1980s and 1990s, it proved difficult to change the clinical practices established at most obstetrical wards in North America over the previous decades and reinstate VBD as the clinical default for breech deliveries. Obstetricians who tried to return to the vaginal route encountered pressure from their colleagues or restrictions from insurance companies and lawyers, whose influence intensified during these years (Amon et al. 1988;[[39]](#footnote-39) Eller and Van Dorsten 1995; Penkin et al. 1996; Zlatnik 1993).[[40]](#footnote-40) Physicians were vulnerable to negligence claims with any VBD that had ““anything less than a perfect result” (Maloy, discussion in Collea et al. 1980). When obstetricians had to make immediate and fateful decisions, medico-legal considerations ultimately prevailed, thus favoring CS (Amon et al. 1988). Obstetricians were subject to additional pressures from the mothers themselves, who, often upon their doctors’ advice, demanded the popular, safe, and innovative new surgery (Flanagan 1987; Hale, discussion in Flanagan 1987; Miller, discussion in Collea et al. 1978), and preferred the risk of maternal morbidity over any risks to their child (Penn et al. 1990). However, apparently the most significant factor preventing VBD from returning to common practice was the collective lack of knowledge and expertise in performing VBDs (Bingham et al. 1987; Gimovsky 1983; Mahomed 1988; Russel 1982; and more). The rarity of breech presentation was compounded by fear over performing vaginal births and residents’ limited exposure to VBD[[41]](#footnote-41) (Eller and Van Dorsten 1995; Penkin et al. 1996). Indeed, young doctors were increasingly reticent to attempt vaginal deliveries, even if they had been trained, as Zuspan testifies:

I can unequivocally state that I have asked the many residents I have trained, whom I felt knew how to do vaginal breech delivery in an adequate and safe manner, what they would do in private practice. One hundred percent said that they would do a cesarean section and would only do a vaginal delivery if the baby was presenting when they got to the delivery room(Zuspan, discussion in Eller and Van Dorsten 1995).

As the gap between the academic literature and clinical practice deepened, so did the dissonance among physicians. On the one hand, they were not unequivocally certain about the benefits of CS, but on the other hand, they regularly performed the procedure in their routine practices[[42]](#footnote-42) As a result, during the decades of the 1980s and 1990s, more and more physicians began referring to breech management as a “controversy,” “dilemma,” or even “conundrum” (Confino et al. 1985; Ellen and Van Dorsent 1995; Myer and Gleicher 1987). The dissonance was evident in obstetricians’ inability to settle the question of what was the appropriate procedure in breech deliveries, an issue which was infused with a sense of urgency due to concerns that the generation of physicians still familiar with VBD techniques would disappear, and, with them, crucial knowledge and expertise (Grave, discussion in Flanagan et al. 1987).

***The Call for an RCT***

The pressure to settle the question of breech management spurred several initiatives in the 1990s to systematically examine the professional literature, in accordance with the evidence-based medicine (EBM) standard established in those years in the United States and Canada, in order to draw a decisive conclusion from the various published studies, most of which did not meet EBM standards themselves[[43]](#footnote-43) (in Canada, Cheng and Hannah 1993;[[44]](#footnote-44) in the United States, Gifford et al. 1995; Grant et al. 1996). Nevertheless, in 1993, Cheng and Hannah found a reasonable basis to conclude that the literature demonstrated lower infant mortality in CS than in VBD, but higher maternal mortality rate in CS, though to a lesser degree. Hence, the authors advocated a return to a policy of ECS for all breech presentations, at least until the issue was conclusively settled via a comprehensive RCT. Their first conclusion was received with harsh criticism[[45]](#footnote-45) (Pollard 1994) and did not help settle the controversy. However, their call for an RCT enjoyed near unanimous approval, as many saw an RCT as the ultimate tool for deciding the controversy (Grave, discussion in Flanagan et al. 1987). They believed it would provide state-of-the-art guidelines and effective protection from malpractice lawsuits, which were rampant in breech cases (Penkin et al. 1996).

Despite concurrence that an RCT was essential, and the willingness to adjust policy based on the results (Penkin et al. 1996), actually conducting such a study proved not so easy. In 1978, an attempt at an RCT had been made in Iowa to determine best practices for preterm breech presentation, but was halted in 1983 due to staff changes at the hospital and medico-legal considerations, which limited eligibility (Zlatnik 1993). This led the FIGO Committee on Perinatal Health to the conclusion in 1993 that random trials on breech delivery could no longer be held in industrialized countries (FIGO 1995). A similar effort in the 1990s by the NICHD was also terminated in its early stages despite a consensus on its necessity, simply because many of the stakeholders did not believe such a study could be successfully carried out and objected to participating in a study doomed to failure (Eller and Van Dorsten 1995).

Ironically, the loss of expertise in VBD was not only a major motivator for conducting an RCT; it was also one of the biggest obstacles to doing so. After three decades of CS as the standard care for breech presentations and the relative success of ECV in eliminating such presentations, and due to the relative rarity of breech births, there simply were not enough obstetricians skilled in vaginal birthing techniques to participate in the study (Eller and Van Dorsten 1995; Penking 1996). This dearth of potential participants was compounded by concerns from the medico-legal perspective (Zuspan, discussion in Eller and Van Dorsten 1996), ethical issues, safety issues, and fear of women’s refusal to participate, as well as the tendency to approve of the existing practice (Eller and Van Dorsten 1995; Penkin 1996). In view of the many challenges, in 1996, the committee behind the American RCT decided not to go forward with the study (Eller and Van Dorsten 1996). The decision, presented at the 57th Annual Meeting of the South Atlantic Association of Obstetricians and Gynecologists in 1995, roused sharp criticism from the audience, especially from veteran obstetricians such as Zuspan, who claimed that the issue had already been settled in the field and was not scientific in character, and that the controversy was a result of obstetricians’ perception that CS was an advanced and scientific procedure, and educated the next generation of physicians accordingly (Zuspan, discussion in Eller and Van Dorsten 1995). At the meeting, obstetricians were also criticized for citing lack of expertise as an excuse for their clear preference for CS, while they actually feared that the RCT results might force them to abandon the easy route in favor of the “scientific” one (O’Sullivan, discussion in Eller and Van Dorsten).

In contrast to what happened in the United States, a different path was chosen by members of the Canadian RCT initiative to examine breech management of term breech babies. The Canadian team sought to conduct a massive, international trial with a sufficiently large sample size, larger than that available in any individual country, to adequately research the issue. To that end, Mary and Wolter Hannah, the principal investigators, recruited medical centers across the United States and Europe to participate in the collaborative enterprise (Hannah and Hannah 1996a, 1996b). In recruiting participants, they cited the obstacles to the American study and presented them as precisely the reason it was crucial to conduct an RCT as a last resort before VBD expertise and the ability to settle the controversy was lost. “Time is running out…as those who are skilled and experienced in the technique of vaginal breech delivery are leaving clinical obstetric practice (Hannah and Hannah 1996a).”

The Canadian team’s call was heeded. The TBT team recruited an unprecedented number of 121 health centers in 26 countries for a study conducted in 1999–2000. Obstetric centers eagerly awaited the results, which could serve as a crucial tool in their defence against malpractice claims. For professional associations, the study presented an opportunity to implement evidence-based quality guidelines rather than rely on policy devised on the basis of the poor and partial findings available to them (ACOG 2000). With the publication of TBT’s decisive interim findings in 2000 (Hannah et al. 2000), the medical community had finally achieved a resolution of the question of the superiority of VBD or elective CS. The study’s conclusions, which clearly advocated a comprehensive policy of ECS for at-term breech presentations, were eagerly and swiftly assimilated by the leading obstetrics organization in the United States and around the world.

Despite the many critiques levelled against TBT and the eventual moderation of its recommended policy (see details in this paper’s Introduction), TBT landed a fatal and institutionalized blow against VBD and effectively finalized the process of collective neglect and loss of knowledge of VBD techniques by physicians and obstetrical departments.

**DISCUSSION**

History tends to highlight formative events and technological success stories, while neglecting the mechanisms that cause the decline of other approaches. In the breech delivery story, such an approach is clearly insufficient. Prior to the TBT study, breech deliveries were at the core of the prominent controversy between VBD and CS, but it was necessary to open the “black box” to gain insight into how the TBT research findings, which tipped the scales in favor of CS, had such a sweeping and comprehensive impact in North America and other Western countries. As described in this paper, the TBT findings, rather than being the cause of widespread and far-reaching changes in clinical practice, as they are often taken to be, were actually the result of changes that had already taken place in clinical practice and the resulting collective decline of VBD skills, which can be traced back to decades earlier.

This process originated in the 1950s, with growing efforts to reduce IMR rates in the United States and the identification of breech presentations as high-risk events. The recognition of these views as scientific fact, along with improvements in CS and diagnostic technologies made CS a worthy, innovative, and simple alternative to VBD. CS enjoyed a heyday in the 1960s and 1970s, when it became standard breech delivery procedure on obstetrics wards. Meanwhile, VBD techniques came to be perceived as outdated and even dangerous, and the view was that they should be retired from clinical practice.

Concurrently, the professional literature sought to establish reliable management protocols for breech presentations, and recommendations from a growing accumulation of research in the 1960s and 1970s left less and less room for vaginal deliveries. Some advocated for increased limitation of conditions in which VBD was permissible. Others called to increase monitoring of breech deliveries, which entailed trial of labor delivery and supervision by specialists skilled in VBD techniques, whose numbers were dwindling. At the same time, ECV was proposed to prevent breech presentation, and once controversial ECV procedures became safer and more efficient. Fear of breech delivery risks, together with the increasing rarity of VBD in the clinical setting, led a new generation of obstetricians, unfamiliar with VBD techniques, to prefer CS, which they could perform skilfully and safely. This approach was supported by legal stakeholders, who entered the controversy in the 1970s, and later by mothers themselves, who demanded the right to have the popular, safe, and innovative CS procedure. All these factors combined to create a clinical reality in which VBDs were rarely performed, and most doctors feared or avoided them, or were not permitted to or did not know how to perform them.

When criticism was levelled against the overuse of CS and doubts were raised regarding their contribution to reducing M&M in the 1980s, it was already difficult to reverse clinical standards. The “controversy” that TBT was designed to resolve in fact originated in the 1980s and 1990s, as disparities grew between doubts about CS in the professional literature and their increasing ubiquity in the clinical setting. In the spirit of the times, with rising EBM, many agreed that the persistent controversy could be decisively resolved only with a gold-standard, state-of-the-art EBM guideline RCT. However, by this point, concerns over VBD, together with diminished expertise in VBD techniques, were so overwhelming that they threatened the prospect of conducting such a study, and, thus, a U.S. study aimed at settling the controversy ultimately failed to even materialize. However, the Canadian RCT initiative that became the TBT succeeding in overcoming these challenges and recruited obstetrics wards around the world, thereby managing to document a sufficient number of breech births to sustain the study. In light of the clinical practices already in place in obstetrics wards during the study, it is reasonable to conclude that the TBT conclusions, which clearly favored CS, provided the final stamp of approval which enabled physicians, policy-makers and legal stakeholders to continue operating as they already had been for years.

What, then, ultimately decided the fate of vaginal breech deliveries? Was is the TBT, for its methodological advantages, broad scope, and unequivocal resolution in favor of CS? Or was it the steady increase in CSs in general in the United States and Canada since the 1970s? While both the TBT and increases in CSs doubtless contributed to the virtual abandonment of VBD, a closer examination of the medical-scientific discourse on breech management indicates that it would be more accurate to claim that the “fate” of VBD was not “sealed” in 2000, but, rather, that VBD had become neglected and collectively forgotten during a long, complex process that unfolded over five decades, starting in the 1950s. The TBT, therefore, simply delivered a decisive blow to vaginal breech deliveries, from which no recovery was possible.

**Appendix 1: Data Collection and “Rescuing” the Main Debate on Breech Management**

Breech deliveries have been the subject of great debate in modern obstetrics. In 1941–2018, over 6,700 articles, editorials, letters and so on were published in the medical-scientific literature on the subject of breech deliveries.[[46]](#footnote-46) Not surprisingly, studies in the United States and Canada constituted about half of the most-cited studies (cited nine times or more) and surpassed 80% when considering citation by papers included in the literature on breech deliveries (internal citations).

To deal with the large body of publications in a systematic and efficient manner, the various discussions in the debate were first mapped, as reflected in internal citations[[47]](#footnote-47) using CiteNetExplorer, which enables a timeline display in order to trace the development of the discourse chronologically. The analysis yielded 10 internal discussions, represented by 10 publication clusters, which tended to cite each other at a greater rate than they cited other papers[[48]](#footnote-48) (Fig. 2).

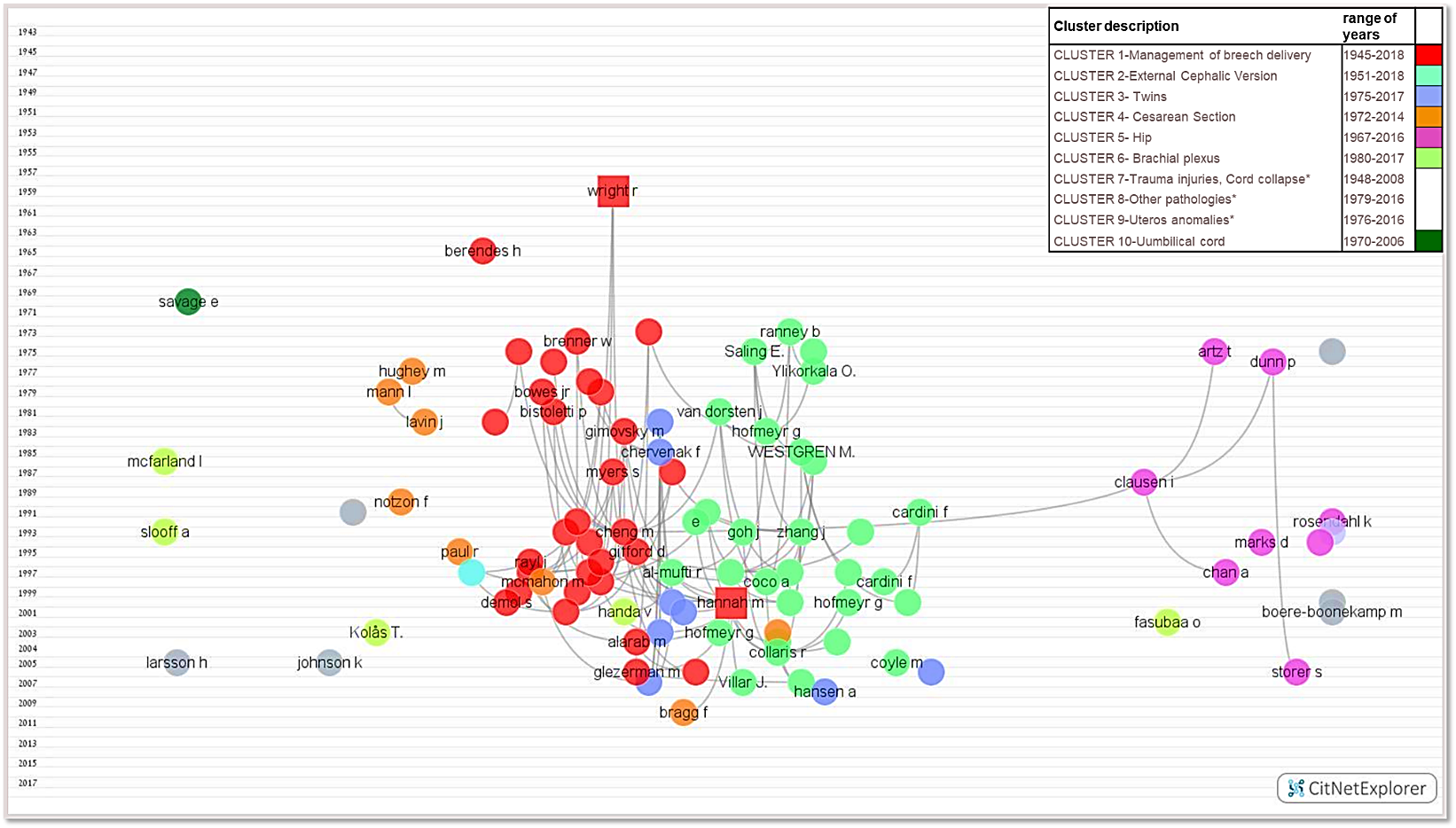


FIGURE 2. The medical-scientific discussion on breech presentation 1941–2018 (100 top-cited publications

\*Clusters 7–9 do not contain publications in the 100 top cited and are therefore not represented in this figure.

\*\*The proximity of publications on the X-axis indicates a high correlation among them. Thus, publications that are centrally located on the map have a higher correlation to all other publications and maintain centrality in the discourse, while publications on the map’s periphery have a lower correlation with other publications. The first three clusters, for example, are centrally located and adjacent to each other, which indicates their centrality in the discourse on breech deliveries.

\*\*\*The range of years reflects the time between the earliest and latest publication dates in each cluster. It should be noted, however, that in general, cited articles appear with a few years. Thus, there is a disparity between the range presented and the above map, which presents only the 100 most-cited publications.

§ The clusters are numbered in descending order by the number of publications included in each cluster: Cluster 1 includes the greatest number of publications, while cluster 10 includes the fewest publications.

The first cluster was central to the breech delivery discourse and was composed of articles that focused on management of breech delivery. Its “centrality” in the discourse is reflected by the fact that it includes the greatest number of publications (396), and the highest rate of citations in the professional literature on breech deliveries (see Fig. 2). The first cluster also reflects the oldest debate, which originated in the 1940s and featured several leading articles, including, unsurprisingly, the TBT study in 2000.

Additional smaller-scale debates on issues related to breech deliveries which developed in tandem with the main discourse are not discussed in this paper. In the 1940s, a debate developed on trauma injuries and cord collapse (cluster 7), and in in the 1950s, there was widespread debate on external version (cluster 2). Later, in the 1970s, the discourse branched off and additional issues were raised: breech delivery in twin pregnancy (cluster 3), CS (with an emphasis on VBAC; cluster 4), hip pathologies (cluster 5), brachial plexus (cluster 6), other pathologies (cluster 8), anomalies of the uterus (cluster 9) and umbilical cord pathologies (cluster 10).

To better understand the development of the professional discourse, including the controversy surrounding breech delivery management, we analyzed publications on breech delivery management (cluster 1) as historical documents written in an evolving historical, clinical and technological context, instead of as a collection of empirical findings. Recurring themes were extracted that reflected the authors’ assumptions on their subject matter, as well as their stated motives for their research and events they considered significant to the discourse. Evidence was also collected[[49]](#footnote-49) on obstetricians’ clinical experience and the consideration and pressures they navigated in deciding how to perform breech deliveries.

1. Other medical associations around the world echoed the call, including the British Royal College of Obstetricians and Gynaecologists (RCOG April 2001), Royal Australian and New Zealand College of Obstetricians Gynaecologists (Hofmeyr and Hannah 2001), Cochrane Collaboration and others. [↑](#footnote-ref-1)
2. See also: Dhingra and Raffi 2010; Glezerman 2010; Lawson 2012. [↑](#footnote-ref-2)
3. Critiques of the study included (in addition to letters to the editor): Dhingra and Raffi 2010; Glezerman 2010, 2012. Some even claim (Glezerman, 2012; Lawson, 2012) that the TBT team itself retracted some of the study’s findings some four years later in papers on the study (Whyte et al. 2000). [↑](#footnote-ref-3)
4. Wright’s paper was one of the 100 most-cited papers on breech births, and one of the first to initiate the discourse on management of breech deliveries. [↑](#footnote-ref-4)
5. The Danish obstetrician Dyre Trolle issued a similar but less known call in 1960. [↑](#footnote-ref-5)
6. During this time, the IMR became the indicator by which the quality of healthcare systems in many countries was measured (Foster 2017 1980). Indeed, it continues to serve as a measure for the quality of health care to this day. The OECD, for example, publishes comparative statistics on infant mortality (Health Status – Infant Mortality Rates Data, n.d.) [↑](#footnote-ref-6)
7. This trend represented a shift away from the presumption that an infant was unlikely to survive (physically and socially) without a mother, and therefore that the mother’s life was of greater priority. [↑](#footnote-ref-7)
8. In the United States, for example. [↑](#footnote-ref-8)
9. Due to the rarity of breech presentations, the task was challenging and demanded collaborations between multiple institutions. A 1956 paper by Hall and Kohl describes a collaboration between seven U.S. institutions to overcome the rarity of breech presentation and gather a large enough sample for statistical comparison. This is one of the reasons that extensive documentation of breech deliveries started in only at this time and not earlier. [↑](#footnote-ref-9)
10. Wright, in fact, does not contribute any new findings but rather relies on three contemporaneous obstetric studies by Goethels (1959), Hall and Kohl (1956), and Harris and Nessim (1956). [↑](#footnote-ref-10)
11. Emphasis in original [↑](#footnote-ref-11)
12. Wright’s paper even became the subject of international attention beyond the borders of North America, and was cited by obstetricians in India (Kapur 1968), the United Kingdom (Donnel 1975), Sweden (Ohlson 1975), Holland (Scutte et al. 1985), and elsewhere. [↑](#footnote-ref-12)
13. Eastman, for example, a leading supporter of CS in the 1950s and 1960s, expressed reservations regarding Wright’s proposal (Eastman, Ed. note, in Wright 1960) [↑](#footnote-ref-13)
14. For a discussion of the term “scientific fact,” see Fleck (1981[1935]) or Latour (?) [↑](#footnote-ref-14)
15. This assumption became so obvious that some even parodied it. For example: “Every obstetrician, nurse, obstetrician’s wife, and most patients know that breech birth is cause for concern…Breach delivery is always formidable…” (Bowes et al. 1979) [↑](#footnote-ref-15)
16. Another sign of its assimilation into the medical-scientific discourse as scientific fact, which is not discussed in the present paper, was the categorization of the keyword “breech presentation” under “labor complication” in the EMTREE medical index starting in 1974 and in the MeSH index from 1985. Prior to that, it had been categorized under “labor obstetrics.” [↑](#footnote-ref-16)
17. According to data from the OECD, average infant mortality rates in member nations declined from an average of 46% in 1960 to an average of 36% in the early 1970s. The rate has continued to decline to this day (source: author’s analysis of official OECD data). [↑](#footnote-ref-17)
18. More detail on this discourse can be found in Appendix 1. [↑](#footnote-ref-18)
19. An examination of the number of studies on breech deliveries versus studies on childbirth overall reveals a very high proportion of studies on breech deliveries, greater than the general trend of increased research in childbirth (Lazar-Shoef, forthcoming). [↑](#footnote-ref-19)
20. This statement originated in Edward Cragin’s book *Conservatism in Obstetrics* (1916), and in the 1970s became one of the most ubiquitous attitudes in obstetrics (Lavin et al. 1982). [↑](#footnote-ref-20)
21. Another lesser known index was the Mark and Roberts Scoring Index (Mark and Roberts 1968) [↑](#footnote-ref-21)
22. For example, in addition to the basic criteria for Ohlsen’s Feto-pelvic Index (1975), elective surgery was recommended in cases of "premature rupture of the membranes, uterine inertia, uterine myomata, delayed fertility, or increased maternal age" (Ed. note, in Ohlsén 1976). [↑](#footnote-ref-22)
23. For example, it was stated regarding the Zatuchni and Andros Scoring System that, “Our experience with the breech score is that a score of 4 is a better cut-off point” (O’Leary, discussion in Bird and McElin, 1975). [↑](#footnote-ref-23)
24. In data collected by Zatuchni and Andros (1965), only 6% of breech births were delivered surgically, while they recommended surgery in 20% of cases. Similarly, Ohlsén reported a rate of 15% of surgical births with breech presentations, but recommended increasing rates to 43%. [↑](#footnote-ref-24)
25. The promotion of elective surgeries, which were considered safer, was possible thanks to the introduction and standardization of new diagnostic technologies (Flanagan 1987), in part due to the use of numerical indices. Thus, for example, one of the conditions for applying the Feto-pelvic Breech Index (and less so the Zatuchni and Andros Index) was x-ray pelvimetry to measure pelvic shape and structure. As ultrasound compatibility with breech presentation improved, this technology, which demonstrated greater accuracy and had better safety than x-rays, became the preferred method in birth management protocol proposed by the indices (Westin 1977). [↑](#footnote-ref-25)
26. See also, for example, Cox (1986); Goldenberg and Nelson (1984); Todd and Steer (1963); and others. [↑](#footnote-ref-26)
27. An extensive scientific-medical debate regarding ECV existed parallel to the debate over breech delivery management and is not centrally addressed in the current paper. For more details, see Appendix 1. [↑](#footnote-ref-27)
28. In the absence of drugs to ease contractions, which were only developed in the 1970s, versions were carried out around weeks 35–36 of pregnancy, after which many fetuses returned to breech position before term. [↑](#footnote-ref-28)
29. “Trial of labor” is considered to mean "Allowing a woman to be in labor... long enough to determine if vaginal birth may be anticipated" (MeSH term definition). [↑](#footnote-ref-29)
30. This was especially true in light of the fact that vaginal births are spontaneous events that often happen during the night, when few specialists are present on the wards. [↑](#footnote-ref-30)
31. The link between over-diagnosing and the increase in CS is discussed in the NIH report on CS (NIH 1980, 329–31) [↑](#footnote-ref-31)
32. CS rates increased, albeit more moderately, in European countries (Russel 1980; Fleming 1983; Notzon 1990; Bistoletti et al. 1981), and in lower income countries such as South Africa as well (De Groot 1980). [↑](#footnote-ref-32)
33. From 1977–1985, the Office of Medical Applications of Research, a branch of the NIH, held several consensus development process conferences with the goal of ensuring that medical and technological research and development, which were largely financed by the public, were properly implemented (Jacoby 1985). The conferences addressed specific questions about controversial technologies that were of special interest to the public, and their goal was to build a consensus among medical, legal, social, and public stakeholders (ibid). [↑](#footnote-ref-33)
34. These measures included the use of consent forms explaining the risks of CS, parent education programs at hospitals, and research collaborations to estimate CS rates. [↑](#footnote-ref-34)
35. The general consensus regarding the risks of breech deliveries led the NIH to comply with the recommendation to allow VBD, but only in the absence of risks indications, such as maternal pelvic structure, fetal weight, non-frank breech, hyperextended head, etc. (NIH 1980a). [↑](#footnote-ref-35)
36. This recommendation is particularly prominent in a report on CS in Canada by a Canadian research team for the National Consensus Conference. The initiative was established as a collaboration between Canadian, American and British stakeholders, and was funded by the Society of Obstetricians and Gynaecologists of Canada and the Association of Professors of Gynecology and Obstetrics (SOGC 1986). Professor Walter Hannah headed the research team, and later took part in the TBT study. [↑](#footnote-ref-36)
37. The critical discourse on CS and promoting VBAC appears in the professional literature on breech deliveries, as it was a major indication for CS. However, it is not discussed at length in the present paper (for more information, see Appendix 1). [↑](#footnote-ref-37)
38. See for example: Green 1983; Hanss 1990; Hofmeyr et al. 1986; Westgren et al. 1985; and additional publications that appear in the discussion on ECV (see Appendix 1). [↑](#footnote-ref-38)
39. In a 1986 survey in the United States, 63% of respondents reported that medico-legal considerations influenced their decision to deliver with CS. [↑](#footnote-ref-39)
40. It seems that in private practices, medico-legal considerations carried particular weight, especially due to the greater emphasis on the mothers’ will, which supported private practitioners in the legal arena (Maloy, discussion in Collea et al. 1980). [↑](#footnote-ref-40)
41. A survey in the 1990s in the United States found that 55% of principal investigators believed their residents were not receiving sufficient training in vaginal delivery techniques (Eller and Van Dorsten 1995). In Canada, the number was even higher (69%) (Penkin et al. 1996). [↑](#footnote-ref-41)
42. A 1986 survey showed that although nearly half of respondents (48%) doubted the efficiency and safety of CS in breech deliveries at term, some 83% of them performed it routinely (regarding premature infants, the agreement on CS was higher) (Amon et al. 1988). [↑](#footnote-ref-42)
43. Most comparisons were retrospective and suffered biases (for example: failure to distinguish emergency and elective CS, primigravida or multigravida, etc.) In fact, only two random comparisons on breech deliveries at term for frank (Collea et al. 1978, 1980) and non-frank (Gimovsky et al. 1983) presentation had been published, but both were limited by small sample size. [↑](#footnote-ref-43)
44. Cheng and Hannah's 1993 review was part of a well-funded Canadian initiative that aimed to examine the feasibility of an RCT about breech deliveries, which later became the TBT. [↑](#footnote-ref-44)
45. This was mainly due to the fact that the only two randomized studies in their review concluded that vaginal births were safe. [↑](#footnote-ref-45)
46. Publications in which the phrases “breech presentation” or “breech delivery” appeared in the title, abstract, and/or keywords (of the MeSH of Embase indices) were retrieved from the Scopus search engine, excluding results irrelevant to the field of obstetrics and gynecology. Data were collected during July and August, 2019. [↑](#footnote-ref-46)
47. The use of citation network analysis to map the various discussions in the professional literature is an effective tool employed by science and technology researchers since the 1980s. It was assumed that citation of an article indicated relevance to a certain professional discourse, even more so before articles were accessible online. [↑](#footnote-ref-47)
48. A review of all the articles in each group showed that each cluster did in fact focus on a distinct aspect of breech deliveries. Details are shown in Fig. 2. [↑](#footnote-ref-48)
49. Authors often described their experiences in their articles’ introductions and conclusions, or in editorial comments. However, most often, such reports were published as transcripts of conferences in which the studies were presented and discussed. [↑](#footnote-ref-49)