**Rehabilitation of Vaginal Microbes Lost from C-Section**

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**During a vaginal birth, the baby is exposed to the mother’s microbiota. Early interaction with the mother’s microbiota is extremely vital for the development of the baby’s immune system and metabolic programming. Babies born via cesarean section lack the maternal vaginal microbiota. Cesarean birthing is linked to a decrease in babies’ immune system, causing medical disorders and diseases. A transfer of maternal vaginal fluids to the C-section delivered baby can restore parts of his or her microbiota. By using gauze previously inserted in the mother, a baby can be enriched in vaginal microbiota. This transfer can reduce health risks for the baby. Future studies can be made to explore the long-term health benefits of transferring microbes.**

**Introduction**

The way a baby is delivered from the mother is strongly associated with the newborn’s immune system. During a natural vaginal delivery, the baby gathers bacterial communities by passing through the mother’s birth canal. This early interaction with the microbes strengthens the baby’s immune development and metabolic processes. Different from a natural birth, babies born via cesarean section, or C-section, do not pass through the birth canal. C-section-delivered babies are not exposed to maternal vaginal fluids; therefore, they have a weaker immune system and possibly a future that consists of illnesses. A study confirmed that delivery mode is as strongly linked to micro biome composition as the infants feeding method, such as breast milk or formula2. Other studies have reported a link between C-section deliveries and an increased risk of obesity, asthma, allergies, and immune deficiencies. Researchers questioned if the microbiota could be restored to the infants by transferring the maternal vaginal fluids at the time of birth. Worldwide, rates of cesarean delivery are increasing. In some countries, 50% of all births use the cesarean delivery method. By knowing if microbita can be restored in cesarean delivered infants, an extra procedure could possibly be preformed in delivery rooms.

**Recent Progress**

Discoveries have been made on the topic of transferring maternal microbes to newly C-section delivered infants. A study was posted in *Nature Medicine* early February of 2016. Maria Dominguez-Bello led the study that resulted in restoring and normalizing C-section infants’ microbiome1. A total of 18 infants and mothers1 were studied, seven born vaginally and 11 delivered via C-section. Of those 11 infants, four were exposed the mother’s vaginal fluids. Each mother who was scheduled to have a C-section had to test negative for sexually transmitted diseases, *Streptococcus*, and viral infections. Also, the mother’s vaginal pH level had to be less than 4.5 at one to two hours before the procedure. An hour before the C-section was performed, sterile gauze was inserted in the mother’s vagina. Moments prior to the surgery starting, the gauze was taken out and placed in a sterile collector and kept at room temperature. Within one minute after the delivery, the infant was swabbed with the gauze. The lips, face, thorax, arms, legs, genitals, anal region, and back were swabbed in this specific order. Samples were taken from all 18 infants within the first five minutes of life, then at day three, and weekly for one month. After analyzing the data, the microbiome of the four C-section delivered infants who were swabbed with the maternal vaginal fluids resembled the vaginally delivered infants. The infants who were not exposed to the vaginal fluids lacked bacteria, such as anal and skin *Lactobacillus* and anal *Bacteroids*1. Microbial colonization of body sites in the newborn occurs quickly, and changes occur throughout the first month of life in all groups tested1. Neonatal bacterial diversity was the highest at birth in the anal and oral sites. However, by the third day it had decreased. On the contrary, the bacterial diversity on the skin of newborns was the lowest at birth, but steadily increased during the first month of life1.

**Discussion**

The results suggest that bacterial communities of newborns delivered by C-section can be restored to resemble infants who were vaginally born. Conclusions were made that the partial microbial restoration observed could be due to the fact that particular body sites, such as the mouth and skin, were more amenable to inoculation that others1. Considering the number of participants and that the study only continued for the first month of life, more results could be conducted in future studies. If the study is done again, there could be small variations in the procedure. For example in a future study, larger gauze could be used, or the amount of time it was in the mother’s vagina could be longer. This particular study required the infant to be only exposed once to the gauze. Possibly exposing the infant more than once to the gauze may cause a different outcome in the amount of bacterial communities in C-section delivered infants. Although the mothers were tested for certain infections, the babies may be at a risk for other infections during the transferring of microbes, some harmful. If transferring maternal vaginal fluids to the baby becomes a normal procedure, there must be another method that prevents transferring harmful microbes. The mother’s health during pregnancy, labor, and delivery may change the results. If the mother is not nurturing the baby through the nine months of pregnancy, the baby may have a weak immune system regardless if he got transferred maternal vaginal fluids. However, each pregnancy and labor cannot be measured in such ways. The opinions of what a healthy pregnancy is vary from mother to mother. For future studies, researchers should study the overall health of the participating babies in different stages of their life. If the researchers continue to follow the infant throughout his life, more discoveries can be made about the long-term health consequences.

The importance of this study’s results is that now C-section delivered babies can strengthen their immune system. This is critical, especially if the infant is born with any illness. Usually premature babies are delivered via C-section. Premature babies need to be enriched in their mother’s vaginal fluids, to help fight off infections in the first months of life. Restoring microbes in premature babies could greatly reduce the number of fatalities of premature babies. Also, this study’s findings can cause other researchers to question the correlation between mode of delivery and immune systems. Researchers could run new studies similar to the one above. In these future studies, the results could be important in lowing the risk of obesity, asthma, and other impaired immune developments.

**References**

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