Dianatal Abstracts

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The use of an obstetric gel reduces labor duration

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Introduction:
Long labour durations, increased maternal morbidity, increased operative deliveries (vaginal operative deliveries (VOD) and c-sections) and lacerations of the birth channel impairs the outcome of primiparous women (PP). PP are increasing in numbers seen in the actual birth rate of 1.4 per women (CH). An increase of the rate of spontaneous deliveries (SD) in PP is important for medical and public health reasons. In PP with SD in occipito-anterior position without a Kristeller maneuver (SDK) it has been shown that the application of an obstetric gel shortens significantly second stage of labor. In this analysis we investigate if the use of an Obstetric Gel alters labor duration in PP with EDA or amniotomy (AMN). Material and methods:
In two ObGyn Departments 251 PP women have been recruited to conduct a randomized controlled prospective trial. The investigated intervention was the application of a specially designed obstetric gel in the first and second stage of labor (1s, 2 S. 181 landbirths did meet the inclusion criterias and have been analysed. For further analysis the SDK group has been divided into subgroups dependent on the use of EDA and AMN.
Results:
In the 181 PP 40 secondary c-sections, 46 VOD and 21 Kristeller maneuver have been performed. These interventions did not show a correlation to the use of the Obstetric Gel. In the 74 SDK +/- AMN and +/- EDA 1s duration was significant reduced by 26 min ($p< 0.025$) (results published). In SDK without AMN and +/- EDA (n= 53) 2s was significant reduced by 33 min ($p< 0.035$). In SDK without EDA and +/- AMN (n=47) 1s was significant reduced by 65 min ($p< 0.049$). In SDK without EDA and without AMN (n=31) 1s&2s was significant reduced by 106 min ($p< 0.015$). In SDK without PDA and +/- AMN (n=47) 1s&2s was significant reduced by 86 min ($p< 0.014$). In SDK without EDA and without AMN (n=31) 1s was reduced by 82 min bordering significance ($p< 0.056$). In SDK without EDA and +/- AMN (n=47) 2s was reduced by 21 min but not significant ($p< 0.086$).
Conclusions:
The use of an obstetric gel during labor, starting early in the first stage of labor, can reduce the 1s, the 2s and the total labor duration by 30 %. The reduction of the first stage of labor and the total labor duration in women not using EDA supports the hypothesis that friction forces are also relevant in the first stage of labor. These forces can be reduced by the use of an obstetric gel.

Quantification of friction reduction by obstetric gels during delivery

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Introduction:
The use of a lubricant to facilitate vaginal childbirth is not yet a standard procedure in human obstetrics although it is a Golden Standard procedure in veterinary obstetrics. Just recently, obstetric gels optimized for labor facilitation in humans have been developed and brought onto the market. In a first randomized controlled study these gels significantly shortened the duration of the second stage of labor and significantly reduced the risk for perineal tears in nulliparous women. The objective of this study was to quantify friction forces of obstetric gels in comparison to distilled water, used as a reference lubricant.
Material and Methods:
Two different lubricants were applied to a mammal model under mechanical conditions comparable to human childbirth with respect to pressure, speed and contact surface. The investigations were performed by a special motorized measurement device developed for this study. In a first test session, the movement speed of the skin relative to the birth canal was modified in order to investigate dynamic friction. In a second test session, the dwell time (i.e. resting time before movement initiation) was modified in order to study static friction forces.
Results:
At higher movement speeds (50 cm/h, 100 cm/h), both of the investigated obstetric gels significantly reduced the dynamic friction force by 30% - 40% in comparison to distilled water as a reference. At the lowest movement speed (10 cm/h), only the gel with the lower content of water and the higher content of carbomer significantly reduced the dynamic friction force. After different dwell times, the static friction forces during trials with gel were generally lower than during trials with distilled water as lubricant.
Conclusion:
The results of the performed mechanical tests support the beneficial use of obstetric gels during human childbirth which has already been shown in first clinical trials.

Virtual Delivery Room as Childbirth Simulation and Training Environment

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Introduction:
The difficulty of introducing doctors into the field of obstetrics can be ameliorated by use of simulators. The goal of this study is to create a Virtual Delivery Room as an immersive environment that can be used for depiction and simulation of human delivery.

Material and methods:
The Virtual Delivery Room is set up like a real delivery. The Virtual Delivery Room contains furniture, equipment and electronic devices as being used in a real delivery room. Devices in the current setup are cardiotocograph (CTG), infusion pump and blood pressure meter. The central part of the Virtual Delivery Room is the haptic interface SIMone(R), which comprises a mother pelvis manikin, together with a fetal head manikin attached to an actuation mechanism. Obstetrician's actions (forces applied to forceps, given medication) are registered and fed into a mathematical model describing the physiological processes relevant during childbirth. The model then calculates the responses of heart rate, uterus contractions, blood oxygen saturation, and blood pressure. This information is then provided to the obstetrician via the devices and manikins used in the Virtual Delivery Room. Output signals include physiological data on paper and screens, movement of fetal head, heart rate sounds, and alarm sounds, and sounds produced by mother and baby (breathing, groaning, screaming).

Results:
The first simulations are capable of displaying a normal birth and basic interventions such as administration of oxytocin and analgesics. Furthermore, basic procedures of assisted delivery using forceps or vacuum pump can also be simulated. Our first mathematical model approach produces already good results that are in agreement with qualitative observations made during real deliveries. The database of different case studies and complications is being built further and validated. The Virtual Delivery Room provides all visual, acoustic, and haptic information relevant during birth.

Conclusion:
The Virtual Delivery Room is a realistic childbirth simulation environment. It will allow obstetricians to train relevant procedures and decision making in complicated cases. Furthermore, it will allow researchers and device developers displaying the physiological processes during birth in a realistic and transparent way.