Childbirth does not have to be so painful

… on reducing the pain of childbirth, or “tailor-made” analgesia…

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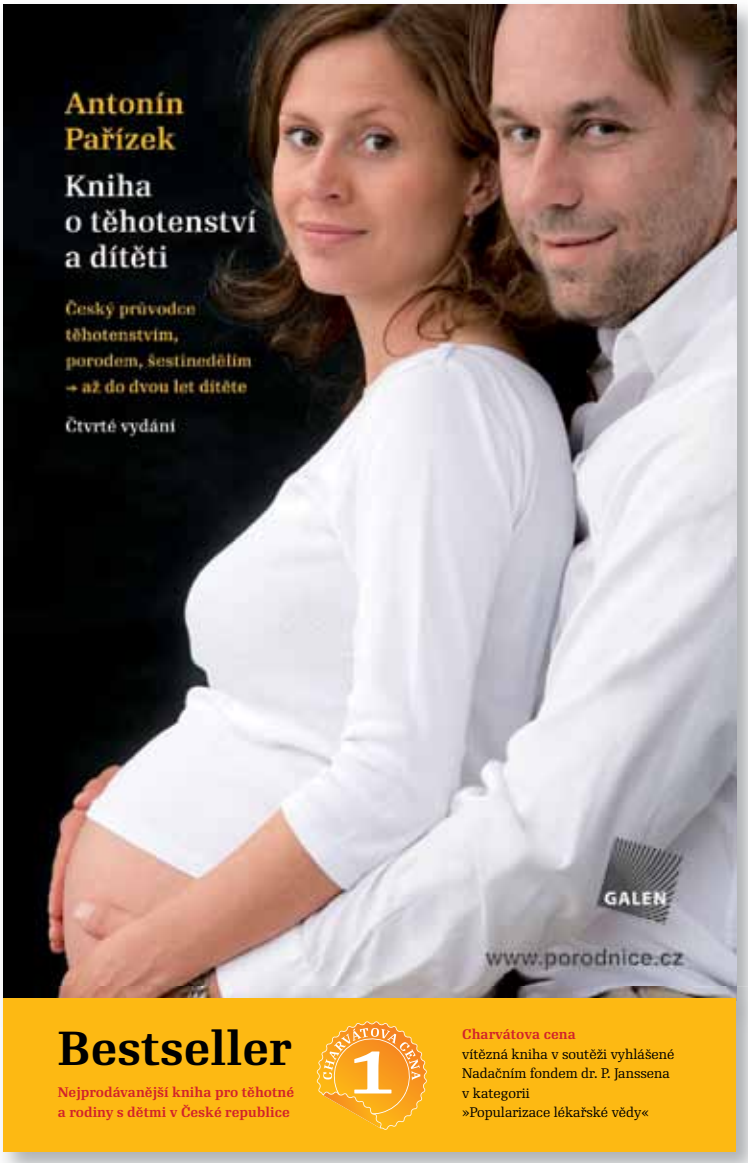

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Childbirth is a natural physiological process that gives many women happiness and satisfaction. On the other hand, the spontaneous birth of a human child typically results in very intense feelings for the mother, along with emotional and physical burdens. Childbirth and labor are thus synonymous with pain and/or significant bodily and emotional stress.

A little terminology, for better understanding...

Analgesia (from the Greek "an" meaning the absence of, and "algos" meaning pain) is a term referring to the lessening or even elimination of pain
Anesthesia means the temporary elimination of not just pain, but also other related perceptions (sensitivity to touch, pressure, etc.), typically used in a surgical setting and administered by an anesthesiologist. Anesthesia can be local or general.
Obstetric analgesia is the attempt to temporarily reduce (but not completely eliminate) the perception of pain during childbirth.

What is childbirth?

Childbirth is the process of the expulsion or extraction (Caesarean section) of a child from the uterine cavity. During spontaneous childbirth the baby is pushed and moved through the so-called birth canal. The birth canal is defined by the pelvic bones (known to specialists as the "bony birth canal") and further by the tissues of the cervix, base of the pelvis, vagina and perineum (or the "soft birth canal"). Childbirth through the natural birth canal (known as "per vias naturales") can only be accomplished by the onset of birthing contractions. These are created by the regular/rhythmic contractions of muscles of the uterus. These uterine contractions are involuntary, and so cannot be controlled willfully. Uterine contractions are often the source of labor pains. Contractions first appear during first stage of birth (stage of opening). The muscles of the uterus are very strong and create a several-hours-long path of movement of the baby through the birth canal. The child (known as the fetus until born) acts passively, and is only moved by the contractions of the uterus. These contractions must overcome the resistance acting on the fetus by the birth canal. The opening of the uterus might be compared to pulling a turtleneck sweater over your head. In the second stage of birth, the mother adds to the uterine contractions with other voluntary muscle contractions, using her abdominal muscles to help expel the baby. The main muscle used is the diaphragm, along with other abdominal muscles. Uterine contractions continue at a much lower level even after birth. These contractions help expel the placenta and amniotic sac, and are known as the third stage of birth.

Why is childbirth painful?

The main reasons for childbirth pains are the shape of the woman's pelvis and size of the fetus's head. The birth of humans is unique among animals for many reasons. During evolution, the straightening of the human body changed the shape of the spine and in particular the shape of the female pelvis. In contrast to all other mammals, the influence of upright walking in humans has resulted in a front-to-back narrowing and a distinctive pelvic floor. By the end of pregnancy, the size of the head of a human fetus (the largest part of its body) approaches the size of the mother's pelvis. Labor and childbirth pains therefore are a result of a complex set of factors. In the first stage of birth, it is mainly the uterine contractions that are painful. Later there are pains resulting from the elastic stretching of the cervix, which must open from 0 cm up to a diameter of about 10 cm. At the end of the birth, dilation and micro-trauma of tissues in the pelvic base, vagina, and perineum play a role, mainly caused by the head of the fetus.

Are there differences between women in how they perceive childbirth pains?

The perception of childbirth pains depends on many factors. Pain is always a subjective experience. First--time mothers and those who have already given birth naturally experience things differently. The intensity of childbirth pains depend on complex physical, psychological, and social influences on mothers. The fetus plays a role as well, with its size, position, and likely even the hormonal activity of the fetus taking part.

Should childbirth pains be suppressed?

Pain is a physiological property of the clearly physiological process that is childbirth. On the other hand, pain in of itself, along with the influences of emotion and stress, can create risks for the process of physiological birth. Currently, effective pain relief during childbirth is expected by most mothers. All analgesic methods used today during childbirth fulfill the basic requirements for use in modern obstetrics: they must not influence the physiology of the mother, the physiology of uterine activity, and in particular the physiology of the child. They are only different in their analgesic capacities (ability to lessen pain), their length of effectiveness, and how difficult they are to administer.

When and what method should women choose?

Even though humans have been giving birth for thousands of years, it has not been until recently that we are able to safely influence the pains of childbirth. The job of every member of the medical team participating in childbirth should be empathetic and never lose sight of the humane approach, even when using the most modern effective techniques. Each woman in our country that enters labor undecided or wants to undergo childbirth without the use of pain medications should still be assured that at any phase of the process her wishes and needs will be respected and help given depending on her state and the course of the birth. Obstetric analgesia today should respect the individual needs of each woman, and be truly "tailor-made".

Various methods for reducing the pain of childbirth

Non-pharmacological Methods

Psychological methods
- Antenatal (before-birth) preparation
- Audioanalgesia
- Hypnosis

Electroanalgesia (TENS)

Hydroanalgeisa
- Relaxing baths
- Water birthing
- Intradermal sterile water injection

Acupuncture, acupressure

Alternative positions

Phytotherapy
- Use of herbal extracts (aromatherapy)

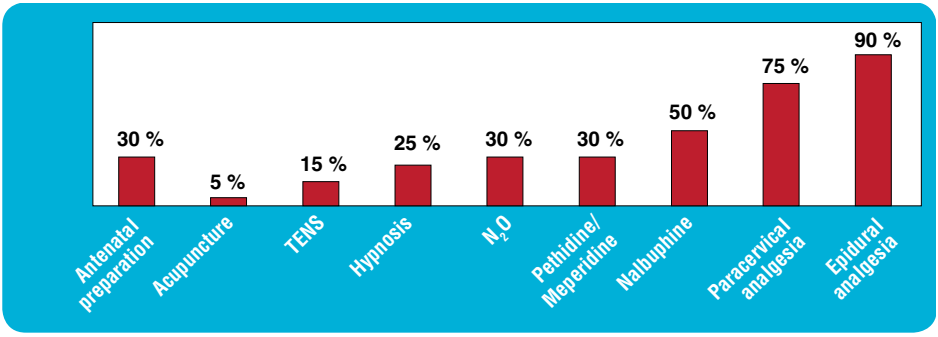
Pharmacological Methods

Systemic analgesia
- Inhalation analgesia
- Intravenous or intramuscular analgesia

Regional analgesia
- Infiltration analgesia
- Pupendal analgesia
- Paracervical analgesia
- Epidural analgesia
- Subarachnoid analgesia
- Combined subarachnoid and epidural analgesia

Levels of pain and methods to reduce them

Effectiveness of particular methods for reducing the pain of childbirth



Non-pharmacological methods for reducing the pains of childbirth

Before-birth (antenatal) preparation

Courses in antenatal preparation are designed based on the fact that fear, anxiety, and tension can change how humans perceive pain. Preparing women before birth helps to achieve important psychological calmness throughout pregnancy.

Advantages:	Disadvantages:
• Simple to administer • Does not negatively influence the mother or child • Financially accessible	• Lower analgesic effectiveness
Analgesic effectiveness: about 30 %	**Administered by:** midwife or birth attendant

TENS (Transcutaneous Electrical Nerve Stimulation)

TENS is an analgesic method that has both physical and psychological impacts. It is a form of analgesia that uses alternating electrical stimulation on both sides of the lower back. Pain is not reduced immediately but within about 40 minutes of starting the treatment. There is an advantage in that this method can successfully be used in combination with other non-pharmacological and pharmacological methods.

Advantages:	Disadvantages:
• Simple to administer • Does not negatively influence the mother or child	• Lower analgesic effectiveness

Analgesic effectiveness: about 15 %
Administered by: the mother, with the help of a midwife or birth attendant

Audioanalgesia

Listening to sounds or music can reduce the perception of pain even without the use of medicines. The principle is based on taking the mind off the pain during uterine contractions. Mothers control the audio equipment themselves.

Advantages:	Disadvantages:
• Simple to administer • Does not negatively influence the mother or child	• Lower analgesic effectiveness

Administered by: the mother, with the help of a birth attendant

Hypnosis

This method is based on a combination of strong suggestion and relaxation. The key to its effectiveness is concentration on other more pleasant feelings that are introduced to the mother.

Advantages:	Disadvantages:
• Does not negatively influence the mother or child	• Lower analgesic effectiveness

Analgesic effectiveness: about 25 % (in more suggestible women)
Administered by: a specialist in hypnotizing (hypnotist)

The use of water for reducing labor pains (hydroanalgesia)

A bath or relaxing shower combined with cool or warm compresses and hot-water bottles placed on the mother's lower back has become a more common method over the past thirty years.

The basic hydroanalgesic methods used for labor pains are:

- Relaxing baths
- Giving birth in the water
- Intradermal local injections of sterile water

Advantages:	Disadvantages:
• Simple to administer • Does not negatively influence the mother or child	• Lower analgesic effectiveness

Administered by: midwife, intradermal water injections are given by a physician

Acupuncture, acupressure

The reduction of pain through acupuncture is commonly explained by the body's release of opioids (endorphins and enkephalins) as well as by blocking the transmission of pain impulses through the spinal cord (the so-called "gate control" theory of regulating and modulating pain). Acupuncture can also be used to induce labor (technically called a non-pharmacological induction of labor) and to lower the pain of procedures such as the surgical repair of wounds resulting from the birth.

Advantages:	Disadvantages:
• Does not negatively influence the mother or child	• Lower analgesic effectiveness

Analgesic effectiveness: about 5 % (in whites)
Administered by: an acupuncturist with experience in childbirth

Alternative positions during childbirth

The position of the mother during birth is an often-ignored procedure. The long-used "traditional" position of the mother on her back can lead to poor circulation in the uterus, placenta and secondarily even low oxygen levels in the blood of the fetus. It can even result in irregular movement and descent of the fetus down the birth canal. While sitting or standing (in technical terms "verticalization"), the anatomical position of the mother's pelvis changes, giving the descending fetus slightly more room and especially lowering the pressure on its head, as well as on the muscles and nerves in the mother's pelvic region. Sitting, using a relaxation ball and having the mother walk around helps not just the irregularity, but also can slightly decrease the pains of uterine contractions.

Phytotherapy – the use of herbal extracts (aromatherapy)

Aromatherapy can include the use of plant oils to which are usually added aromatic essences. The most common are sunflower, olive, sesame or almond oils. Added to the natural compounds in the oil are individual or combinations of lavender, chamomile, nutmeg, jasmine, sage, black pepper, tea tree, etc. These compounds are usually applied using massage, warm compresses, or inhalation.

Advantages:	Disadvantages:
• Simple to administer	• Lower analgesic effectiveness

Analgesic effectiveness: less than 10 %
Administered by: the mother herself or a partner, midwife

Pharmacological Methods

Systemic analgesia

Systemic analgesia is a way to soothe pain using an effective substance (medicine, analgeticum) that acts on the central nervous system (the brain of the mother), regardless of how it is administered. The method of administering the analgesic is usually by injection (subcutaneously, into muscle, or into a vein) or by inhalation

Nalbuphine

Nalbuphine is one of a group of medicines able to soothe pain (opioid analgesics). It is used for short-term lessening of intermediate to strong pan. It is very useful for soothing labor pains. The medicine can also be used to ease pain after a cesarean section or after other surgical operations. Nalbuphine does not influence the mother's breathing center as much as other commonly used substance for soothing pain with opioid characteristics (for instance Dolsin® or pethidine/meperidine). It does not have negative side-effects on the smooth muscles of the gastrointestinal tract or urinary tract, and so does not lead to constipation or inability to urinate (a great benefit during childbirth). The timing of pain relief depends on the method of administration. The analgesic affect begins after about 3-15 minutes and lasts 3-6 hours. The dose can be repeated after this period. As opposed to other opioids, Nalbuphine does not release histamine, it does not cause skin itching. The recommended dose of Nalbuphine (15-20 mg) does not lead to a significant decrease in the activity of the child, even if being breast-fed. These properties make Nalbuphine a very suitable analgesic for use in decreasing labor pains.

Advantages:	Disadvantages:
• Simple to administer • Financially accessible • From the point-of-view of safety and effectiveness in lessening pain, the only real current alternative in childbirth is epidural analgesia	• At the recommended dose, there are no serious risks to mother or child

Analgesic effectiveness: around 50 % **Administered by:** midwife, obstetrician

Pethidine/Meperidine

Pethidine used to be very commonly given as a systemic analgesic during childbirth, even though its affect in lessening pain was relatively weak and though it may have had negative influence on the child even up to 3-4 days after birth. Some children of mothers who received pethidine had more difficulty adapting after birth, had redder skin and were more restless.

Advantages:	Disadvantages:
• Simple to administer • Financially accessible	• Lowers the breathing of mother and fetus. Lower self-control, in some cases loss of memory by the mother (no memories of the birth, amnesia). Can lead to an inflammatory reaction in the newborn even several days after administration of pethidine to the mother, because residual amounts continue to appear in the breast milk for 3-4 days.
Analgesic effectiveness: around 30 %	**Administered by:** midwife, obstetrician

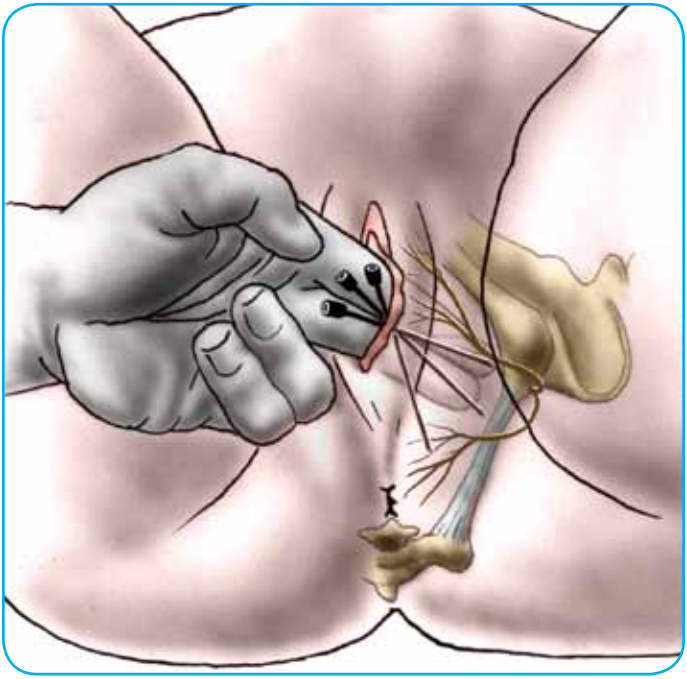
Inhalation analgesia

Inhalation analgesia works by breathing in a gas that is able to reduce pain. Currently, a mixture of 50 % nitrous oxide (N_2O, or "laughing gas) and 50 % oxygen (O_2) is allowed during childbirth. This inhalation method, with its sedative, relaxing and analgesic effects, has a long tradition in obstetrics. Today, specially constructed equipment is used to deliver the gas (**ENTONOX**), with the mixture delivered through a highly-sophisticated ventilation system through the mouth. The use of inhalation analgesia is safe and non-invasive. It has minimal undesirable side-effects and does not affect the fetus. It does not influence the health of either mother or child

Advantages:	Disadvantages:
• Simple to administer	• The effectiveness is very individual
Analgesic effectiveness: around 30 %	**Administered by:** midwife

Regional analgesia

Regional analgesia is a set of procedures during which a local anesthetic is given to alter the perception of pain. Local anesthetics cause nerve fibers to temporarily halt the transmission of pain from the periphery (birth canal) to the central nervous system (brain). Regional analgesia, especially epidural, is different than other methods in that the highly effective analgesic effects also help to treat or even normalize a range of other obstetric complications. They thus are known as having a wider spectrum of effects or medical indications.

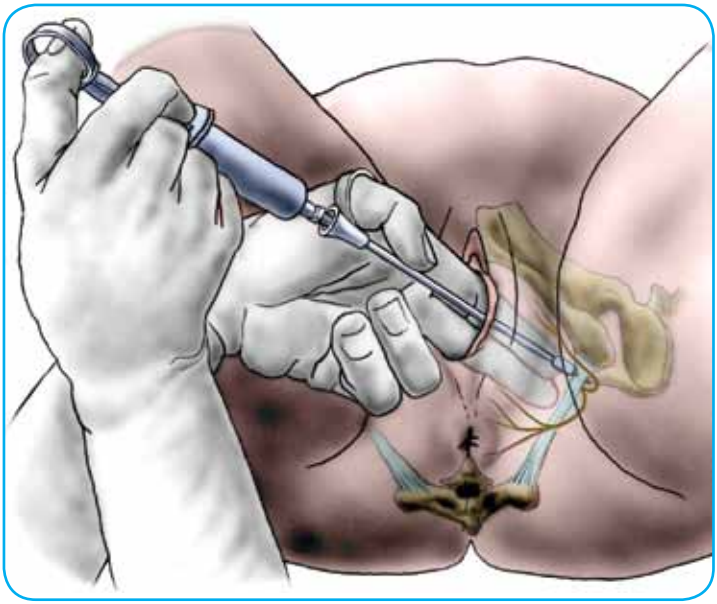


Local injections in the cervix or vagina

This method is not one of those that significantly influence labor pains, since they are performed just before or just after the birth of the baby. The local anesthetic used does not therefore influence the newborn.

Advantages:	Disadvantages:
• Simple to administer • Financially accessible	• Lower effectiveness

Administered by: midwife, obstetrician

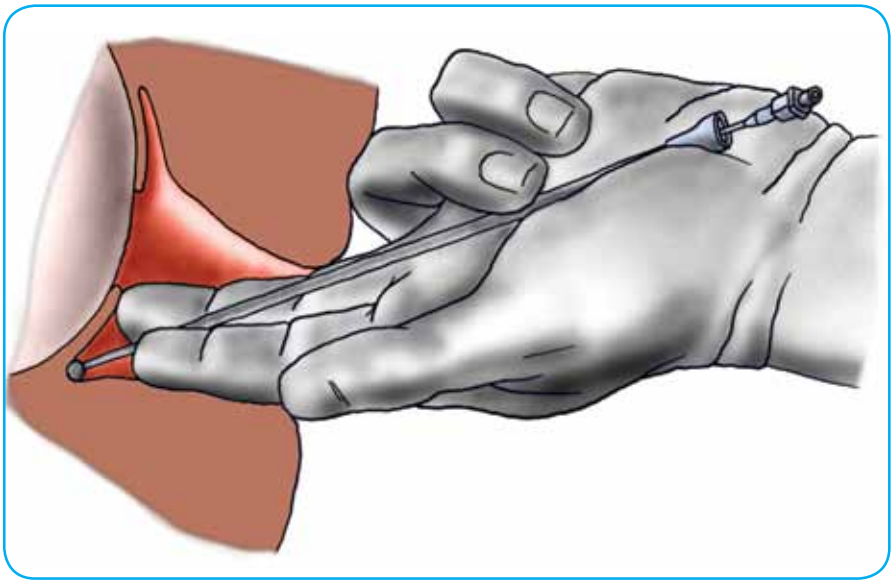


Pudendal analgesia (pudendal block)

A local anesthetic is injected in the pubic nerve (nervus pupendus), which transmits pain signals to the base of the brain. Relief is felt only in the cervix and outer third of the vagina. This method is useful for just a short period of labor, just before the final stage.

Advantages:	Disadvantages:
• Simple to administer • No drop in blood pressure in the mother • Financially accessible	• The effectiveness is low • Affects just a short part of the birth canal, and only during the second stage of birth • Up to 50 % of pupendal blocks are not effective • Sometimes lengthens the second stage of birth, and can reduce the urge to push • Cannot be used to relieve pain from cesarean sections

Administered by: midwife, obstetrician

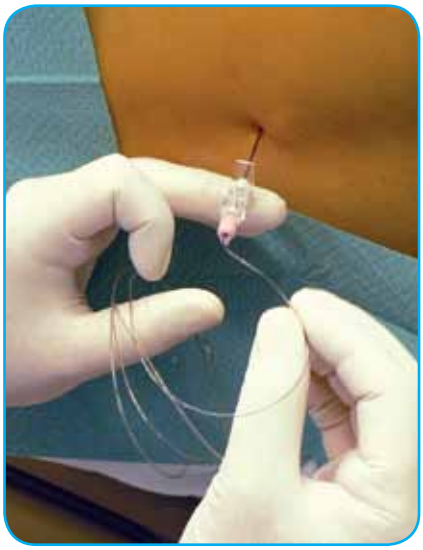


Paracervical analgesia (paracervical block)

A local anesthetic is injected close to the nerves in the area near the cervix ("peri" is latin for "next to"). This temporarily blocks pain from the birthing canal to the brain and thus the pain centers of the brain. Relief is felt in a significant part of the abdomen and upper part of the vagina.

Advantages:	Disadvantages:
• Highly effective analgesic method • No drop in blood pressure in the mother • Lasts from 60 – 90 minutes • Easily administered from organizational and personnel standpoints	• The main risk is that in 10-50% of fetuses there are temporary changes to heart rhythm, so the fetus must be carefully monitored (cardiotocographic monitoring) • Analgesia not effective during the second stage of birth • Cannot be used to relieve pain from cesarean sections

Analgesic effectiveness: around 70 %
Administered by: only very experienced obstetricians

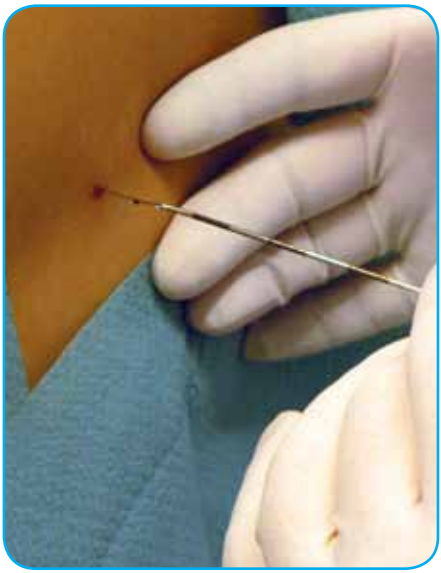


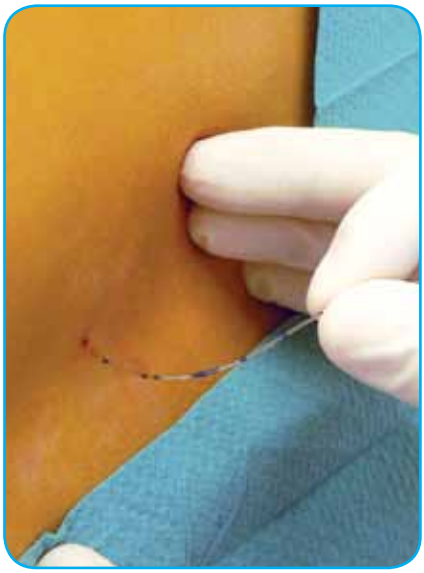
Epidural analgesia (epidural block)

Synonyms: peridural, extradural analgesia. A very small amount of local anesthetic is injected with a special needle into the epidural space, today commonly along with other substances (most often an opioid). The epidural space lies just outside the sleeve of the spinal cord. Anesthetics given here temporarily block pain from the birth canal to the pain centers of the brain. Because of its great effectiveness and safety, epidural analgesia is currently the most commonly used method of obstetric analgesia, and is favored by mothers worldwide.

Advantages:	Disadvantages:
• An almost ideal method for use in modern obstetric analgesia • Positive effects on the process of childbirth, on the psychology of the mother and on the health of the newborn • Does not prevent the free movement of the mother during birth, allows alternative positions of the mother during birth • Epidural analgesia can be given for as long as necessary, since after 60 – 90 minutes repeated doses can be given through the epidural catheter	• A difficult from an organizational standpoint, there must be an anesthesiologist or better yet a team of anesthesiologist available that are experienced in local anesthesia and especially the unique situations arising during childbirth and care of pregnant women • A risk of damaging the sleeve of the spinal cord, risk of headaches after the birth, which occur in about two women out of a hundred (2 %) • The financially most expensive of all obstetric analgesic methods

Analgesic effectiveness: around 90 %
Administered by: it is recommended that this method be administered only be an experienced obstetrician or midwife along with an experience anesthesiologist. Even other midwives attending a birth using epidural analgesia should be given specialized training.





Subarachnoid analgesia (subarachnoid block)

Synonyms: spinal, lumbar analgesia
A local opioid anesthetic is given directly into the spinal fluid. This influences the spreading of pain signals in nerve fibers and in the spine itself

How it is administered:

- administration is the same as in epidural analgesia, expect that instead of stopping in the epidural space the sleeve of the spinal cord (dura mater and arachnoidea) are punctured allowing injection directly into the spinal fluid
- a specialized very fine needle is used with a point designed to minimize trauma

Advantages:	Disadvantages:
• Minimally influences the mother and fetus • Analgesia starts immediately (as opposed to epidural analgesia)	• Perforation of the dura mater and arachnoidea leads to an increased risk of headaches (post-puncture cephalea) and infection
Analgesic effectiveness: around 90 %	**Administered by:** anesthesiologist

Combined subarachnoid and epidural analgesia

A combination of the two previous methods.

A few words in conclusion...

Predicting the intensity of labor pains and the course of childbirth is very difficult, or rather impossible (especially in first-time mothers). Some women tolerate pain well, others require effective relief. Sometimes the most simple approaches, such as a relaxing environment, massages, or walking are sufficient, while other times the help of a birth attendant, obstetrician or even anesthesiologist may be necessary. Choosing the right approach or analgesic methods should always be done according to the actual situation, development of the birth process, and the individual wishes of the mother. Each woman in the Czech Republic should have sufficient objective information to help them in their choice. Mothers should then have the option to ask for help during any time of the birth process, and the health care personnel should always respect these wishes and do what they can to accommodate them. Each facility designed for maternity care should offer the widest possible scale of methods for alleviating the pains of labor and childbirth, in order to satisfy the wishes of the majority of women, especially keeping in mind a strictly individual approach.

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