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The term "implantation" is used to describe process of attachment and invasion of the [uterus](https://embryology.med.unsw.edu.au/embryology/index.php/U#uterus) endometrium by the blastocyst (conceptus) in placental animals. In humans, this process begins at the end of week 1, with most successful human pregnancies the conceptus implants 8 to 10 days after ovulation, and early pregnancy loss increases with later implantation.[[1]](https://embryology.med.unsw.edu.au/embryology/index.php/Implantation#cite_note-PMID10362823-1) The implantation process continues through the second week of development.

The initial phase of the implantation process is "adplantation". This first phase requires the newly hatched blastocyst to loosely adhere to the endometrial epithelium, often "rolling" to the eventual site of implantation where it is firmly adhered. This process requires both the blastocyst adhesion interaction with the endometrium during the "receptive window".

Subsequent development of the placenta allows maternal support of embryonic and fetal development. If implantation has not proceeded sufficiently during the menstrual cycle to allow hormonal feedback to the ovary, then the next cycle may commence leading to conceptus loss. There is also evidence, from animal models, that a conceptus with major genetic does not develop or implant correctly leading to their loss during the first and second weeks of development.

In recent years with the development or [Assisted Reproductive Technologies](https://embryology.med.unsw.edu.au/embryology/index.php/Assisted_Reproductive_Technology) (ART or IVF) there is a growing interest in this process, with techniques that introduce the blastocyst into the uterus to allow normal implantation to occur.

Abnormal implantation is where this process does not occur in the body of the [uterus](https://embryology.med.unsw.edu.au/embryology/index.php/U#uterus) (ectopic) or where the placenta forms incorrectly. In addition implantation can occur normally but with an abnormal conceptus, as in a hydatiform mole development.

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| Abnormal implantation sites or Ectopic Pregnancy occurs if implantation is in uterine tube or outside the uterus. * sites - external surface of uterus, ovary, bowel, gastrointestinal tract, mesentry, peritoneal wall
* If not spontaneous then, embryo has to be removed surgically

**Tubal pregnancy** - 94% of ectopic pregnancies * if uterine epithelium is damaged (scarring, pelvic inflammatory disease)
* if zona pellucida is lost too early, allows premature tubal implantation
* embryo may develop through early stages, can erode through the uterine horn and reattach within the peritoneal cavity

Another type of abnormality is when only the conceptus trophoblast layers proliferates and not the embryoblast, no embryo develops, this is called a "hydatidiform mole", which is due to the continuing presence of the trophoblastic layer, this abnormal conceptus can also implant in the uterus. The trophoblast cells will secrete human chorionic gonadotropin (hCG), as in a normal pregnancy, and may appear maternally and by pregnancy test to be "normal". Prenatal diagnosis by ultrasound analysis demonstrates the absence of a embryo. There are several forms of hydatidiform mole: partial mole, complete mole and persistent gestational trophoblastic tumor. Many of these tumours arise from a haploid sperm fertilizing an egg without a female pronucleus (the alternative form, an embryo without sperm contribution, is called parthenogenesis). The tumour has a "grape-like" placental appearance without enclosed embryo formation. Following a first molar pregnancy, there is approximately a 1% risk of a second molar pregnancy. This topic is also covered in [Placenta - Abnormalities](https://embryology.med.unsw.edu.au/embryology/index.php/Placenta_-_Abnormalities) |  |  |