

# Conjoined Twins <sup>[1]</sup>

By: DeRuiter, Corinne Keywords: [Fetus](#) <sup>[2]</sup>

Conjoined twins are twins whose bodies are anatomically joined *in utero*. The degree to which the twins are attached can range from simple, involving skin and cartilage, to complex, including fusion of the skull(s), brain(s), or other vital organs. There are more than a dozen classifications of [conjoined twins](#) <sup>[3]</sup> but what they all tend to have in common is the sharing of the [chorion](#) <sup>[4]</sup>, [placenta](#) <sup>[5]</sup>, and [amniotic sac](#) <sup>[6]</sup>.

The most prevalent type of [conjoined twins](#) <sup>[3]</sup> is thoraco-omphalopagus, which describes two bodies fused from the upper chest to the lower chest. These twins usually share a heart and may also share a liver or parts of the digestive system. Thoracopagus twins are fused from the upper thorax to the lower belly and always share a heart, making the twins reliant on each other for survival. In contrast, omphalopagus twins never share a heart but are fused at the lower chest; they usually share a liver, digestive system, or other organs. Parasitic twins are asymmetrically conjoined, meaning that one twin is underdeveloped and dependent on the other twin for survival. If the [conjoined twins](#) <sup>[3]</sup> are fused at the skull but have separate bodies, the condition is known as craniopagus twins. There are several other less common forms of [conjoined twins](#) <sup>[3]</sup> which include:

- Cephalopagus: two faces on opposite sides of a conjoined head with a fused upper body
- Synecephalus: one head with a single face, four ears, and two bodies
- Cephalothoracopagus: fused at head and thorax, two faces in opposite directions
- Xiphopagus: fused from xiphoid cartilage that extends from naval to sternum
- Ischopagus: fused lower half of two bodies with spines conjoined end-to-end at a 180° angle, four arms, two, three, or four legs, and one external genitalia
- Parapagus: side-by-side fusion with a shared pelvis, may have one trunk with one head and two faces or one trunk with two heads and two, three, or four arms
- Pygopagus: back-to-back fusion at the buttocks

There are at least two main hypotheses about the development of [conjoined twins](#) <sup>[3]</sup>. The first is fission theory, which states that a single [fertilized egg](#) <sup>[7]</sup> splits incompletely, causing two embryos to form but remain fused at the un-separated part. The second, fusion theory, states that a [fertilized egg](#) <sup>[7]</sup> completely separates, but due to their proximity *in utero*, cells from one twin may come in contact and interact with cells from the other twin, resulting in cell signaling and eventually conjoined anomalies. Researchers have also described environmental factors as a potential cause of conjoined twinning.

Many [conjoined twins](#) <sup>[3]</sup> are stillborn or born with abnormalities that lead to early death. If the twins are [viable](#) <sup>[8]</sup>, the parents may decide to surgically separate them, a procedure specific to each case. Surgical complications include the formation of blood clots in newly formed vessels, cranial bleeding, heart complications, and infections. In deciding whether or not to separate, parents and physicians alike often consider whether or not the surgery will improve the quality of life for the twins. At times, the decision is so contentious that the ethics of the separation is brought under the purview of legal review.

An early depiction of [conjoined twins](#) <sup>[3]</sup> was a statue consisting of two women fused at the hip, discovered in a Neolithic shrine in Asia. Conjoined twins have been depicted in ancient ceramics created by the early Moche civilization of Peru dating back to approximately 300 AD. The first historically documented case of [conjoined twins](#) <sup>[3]</sup> was in the year 945 when conjoined Armenian brothers were brought to Constantinople for medical evaluation.

Although the incidence rate is low, [conjoined twins](#) <sup>[3]</sup> have allowed embryologists to further explore the dimensions of development in multi-fetal pregnancies. Embryologists may one day be able to prevent and control the fusion of embryos *in utero*, alleviating the surgical complications and ethical controversies which surround [conjoined twins](#) <sup>[3]</sup>.

## Sources

1. "Conjoined Twins." The University of Maryland Medical Center. [http://www.umm.edu/conjoined\\_twins/facts.htm](http://www.umm.edu/conjoined_twins/facts.htm) <sup>[9]</sup> (Accessed August 30, 2010).
2. Davis, Colleen. "Separating Conjoined Twins: A Medical and Criminal Law Dilemma." *Journal of Law and Medicine* 17

(2010): 594–607.

3. Gillon, Raanan. "Jodie and Mary, Conjoined Twins: A Case of Judicial Moral Hubris?" *Medico-Legal Journal* 72 (2004): 3–16.
4. Kaufman, Matthew. "The Embryology of Conjoined Twins." *Child's Nervous System* 20 (2004): 508–25.
5. Kim, Jeong-Ah, Jeong Yeon Cho, Young Ho Lee, Mi Jin Song, Jee-Yeon Min, Hak Jong Lee, Byoung Hee Han, Kyung-Sang Lee, Byung Jae Cho, and Yi-Kyeong Chun. "Complications Arising in Twin Pregnancy: Findings of Prenatal Ultrasonography." *Korean Journal of Radiology* 4 (2003): 54–60.
6. Spencer, Rowena. *Conjoined Twins: Developmental Malformations and Clinical Implications*. Baltimore, MD: The John Hopkins University Press 2003.

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