

Our History of Expertise

Under the direction of Dr. Michael Harrison, the Fetal Treatment Center was the first institution to develop fetal surgery techniques. The first fetal surgery in the world was performed at UCSF over 3 decades ago. We have more experience with fetal surgery and endoscopic fetal intervention than any other institution in the world.

Video History of the Fetal Treatment Center

Fetal Beginnings at UCSF ^[1]	Pre-Term Labor ^[2]	FTC Surgical Breakthrough ^[2]
Fetal First: CDH ^[3]	Our Heroes: The Patients and Families ^[4]	The Moms of Fetal Treatment ^[3]

Fetal Firsts

1980 Techniques for open fetal surgery first developed in animal models at UCSF

[Harrison MR, Jester JA, Ross NA. Correction of congenital diaphragmatic hernia ^[5] in utero. *Surgery* 1980;88:174; Harrison MR, Anderson J, Rosen MA et al. Fetal surgery in the primate. *J Pediatr Surg* 1982;17:115]

1981 First open fetal surgery performed at UCSF. A vesicostomy was placed in a fetus with a urinary obstruction

[Harrison MR, Golbus MS, Filly RA, et al. Fetal surgery for congenital hydronephrosis. *N Engl J Med* 1982;308:591-3]

1981 First successful sonographically guided placement of a fetal urinary catheter (Harrison vesicoamniotic shunt) for bladder outlet obstruction.

[Golbus MS, Harrison MR, Filly RA, et al. In utero treatment of urinary tract obstruction ^[6]. *Am J Obstet Gynecol* 1982;142:383-8]

1984 Uterine stapling device for fetal surgery was designed and first used at UCSF

[Adzick NS, Harrison MR, Bottles K. Use of uterine stapling device for experimental fetal surgery and cesarean section. *SURG FORUM* 1985;36:479-481]

1984 First successful resection of fetal congenital cystic adenomatoid malformation of the lung (CCAM).

[Harrison MR, Adzick NS, Jennings RW, Duncan BW, Rosen MA, Filly RA, Goldberg JD, deLorimier AA, Golbus MS. Antenatal intervention for congenital cystic adenomatoid malformation [7]. *Lancet*. 1990 Oct 20;336(8721):965-7]

1986 Transplantation of fetal hematopoietic stem cells in utero first demonstrated in animal models at UCSF.

[Flake AW, Harrison MR, Adzick NS, Zanjani ED. Transplantation of fetal hematopoietic stem cells in utero: the creation of hematopoietic chimeras. *Science*. 1986 Aug 15;233(4765):776-8.]

1989 First successful open fetal surgery for congenital diaphragmatic hernia.

[Harrison MR et al. Successful repair in utero of a congenital diaphragmatic hernia [5] after removal of herniated viscera from the left thorax. *N ENGL J MED* 1990;322:1582-4]

1991 Radiotelemitters were first developed and used to monitor the fetus? condition during and after fetal surgery.

[Jennings RJ, Adzick NS, Longaker MT, Harrison MR Radiotelemetric fetal monitoring during and after open fetal surgery. *SURG OBSTET & GYNECOL* 176:59-64, 1993]

1992 First resection of a fetal sacrococcygeal teratoma.

[Langer JC, Harrison MR, Schmidt KG, Silverman NH, Anderson RL, Goldberg JD, Filly RA, Crombleholme TM, Longaker MT, Golbus MS. Fetal hydrops and death from sacrococcygeal teratoma [8]: rationale for fetal surgery. *Am J Obstet Gynecol*. 1989 May;160(5 Pt 1):1145-50]

1993 Congenital High Airway Obstruction (CHAOS) Syndrome first described (and named) at UCSF.

[Hedrick MH, Martinez-Ferro M, Filly RA, Flake AW, Harrison MR, Adzick NS: Prenatal diagnosis of congenital high airway obstruction (CHAOS): Potential for perinatal intervention. *J Pediatr Surg* 29(2):271-274, 1994]

1994 First NIH sponsored clinical trial for fetal surgery was done at UCSF: open repair of congenital diaphragmatic hernia.

[Harrison MR, Adzick NS, Bullard KM, et al. Correction of congenital diaphragmatic hernia [5]. VII. A prospective trial. *J PEDIATR SURG* (32) 11: 1637-1642,1997]

1994 Repair of fetal myelomeningocele (spina bifida) first demonstrated in animal models.

[Meuli M, Meuli-Simmen C, Hutchins GM, Yingling CD, Hoffman KM, Harrison MR, Adzick NS. In utero surgery rescues neurological function at birth in sheep with spina bifida [9]. *Nat Med*. 1995 Apr;1(4):342-7; Meuli M, Meuli-Simmen C, Yingling CD, Hutchins GM, Hoffman KM, Harrison MR, Adzick NS. Creation of myelomeningocele in utero: a model of functional damage from spinal cord exposure in fetal sheep. *J Pediatr Surg*. 1995 Jul;30(7):1028-32]

1995 EXIT (Ex utero Intrapartum Treatment) procedure for fetal airway obstruction first

developed (and named) at UCSF.

[Mychaliska GB, Bealer JF, Graf JL, Rosen MA, Adzick NS, Harrison MR. Operating on placental support: the ex utero intrapartum treatment procedure. J Pediatr Surg. 1997 Feb;32(2):227-30]

1996 First successful fetoscopic temporary tracheal occlusion for CDH: The Fetendo Clip procedure

[Harrison, MR, Mychaliska GB, Albanese, CT, et al. Correction of congenital diaphragmatic hernia [5] in Utero IX: Fetuses with poor prognosis (liver herniation and low lung-to-head ratio can be saved by fetoscopic temporary tracheal occlusion. J PEDIATR SURG 33 (7): 1-8, 1998]

1996 First successful resection for fetal sacrococcygeal teratoma (SCT)

[Graf JL, Albanese CT, Jennings RW, Farrell JA, Harrison MR. Successful fetal sacrococcygeal teratoma [8] resection in a hydropic fetus. J Pediatr Surg. 2000 Oct;35(10):1489-91]

1998 First successful resuscitation of a fetus during open fetal surgery

[Graf JL, Paek BW, Albanese CT, Farrell JA, Kitterman JA, Jennings RW, Harrison MR. Successful resuscitation during fetal surgery. J Pediatr Surg. 2000 Sep;35(9):1388-9]

1998 First successful fetoscopic laser treatment of a single A-V communication in twin-twin transfusion syndrome

[Feldstein VA, Machin GA, Albanese CT, Sandberg P, Farrell JA, Farmer DL, Harrison MR. Twin-twin transfusion syndrome [10]: the ?Select? procedure. Fetal Diagn Ther. 2000 Sep-Oct;15(5):257-61]

1999 Fetoscopic repair of fetal myelomeningocele (spina bifida) introduced.

[Farmer DL, von Koch CS, Peacock WJ, Danielpour M, Gupta N, Lee H, Harrison MR. In utero repair of myelomeningocele [9]: experimental pathophysiology, initial clinical experience, and outcomes. Arch Surg. 2003 Aug;138(8):872-8]

2000 First NIH sponsored randomized controlled trial for fetal surgery was done at UCSF: Temporary tracheal occlusion for severe congenital diaphragmatic hernia--The Fetendo Balloon Procedure

[Harrison MR, Keller RL, Hawgood SB, Kitterman JA, Sandberg PL, Farmer DL, Lee H, Filly RA, Farrell JA, Albanese CT. A randomized trial of fetal endoscopic tracheal occlusion for severe fetal congenital diaphragmatic hernia [5]. N Engl J Med. 2003 Nov 13;349(20):1916-24]

2001 First successful radiofrequency ablation (RFA) procedure for anomalous twins.

[Tsao K, Feldstein VA, Albanese CT, Sandberg PL, Lee H, Harrison MR, Farmer DL. Selective reduction of acardiac twin [11] by radiofrequency ablation. Am J Obstet Gynecol. 2002 Sep;187(3):635-40]

2003 The Management of Myelomeningocele Study? or MOMS

A randomized clinical trial comparing fetal surgical repair of myelomeningocele (spina bifida) to standard postnatal repair was first developed at UCSF. Later incorporated into a three-center national trial, 'The Management of Myelomeningocele Study? or MOMS. See MOMS website at www.spinabifidamoms.com [12] for details of this ongoing study.

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Links

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[2]

<http://www.youtube.com/watch?v=NxXubVAPEEU&feature=Playlist&p=5575F2DC1AC8B997&index=5>

[3]

<http://www.youtube.com/watch?v=K2VVSLXvNtQ&feature=Playlist&p=5575F2DC1AC8B997&index=5>

[4]

<http://www.youtube.com/watch?v=RjHIVQX4vE4&feature=Playlist&p=5575F2DC1AC8B997&index=5>

[5] <https://fetus.ucsf.edu/cdh>

[6] <https://fetus.ucsf.edu/urinary-tract-obstruction>

[7] <https://fetus.ucsf.edu/cpam>

[8] <https://fetus.ucsf.edu/sct>

[9] <https://fetus.ucsf.edu/spina-bifida>

[10] <https://fetus.ucsf.edu/ttts>

[11] <https://fetus.ucsf.edu/trap-sequence>

[12] <http://www.spinabifidamoms.com>