

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

POLICY NUMBER	LAST REVIEW DATE	APPROVED BY
MG.MM.SU.65cC3	10/14/2022	MPC (Medical Policy Committee)

IMPORTANT NOTE ABOUT THIS MEDICAL POLICY:

Property of ConnectiCare, Inc. All rights reserved. The treating physician or primary care provider must submit to ConnectiCare, Inc. the clinical evidence that the patient meets the criteria for the treatment or surgical procedure. Without this documentation and information, ConnectiCare will not be able to properly review the request for prior authorization. This clinical policy is not intended to pre-empt the judgment of the reviewing medical director or dictate to health care providers how to practice medicine. Health care providers are expected to exercise their medical judgment in rendering appropriate care. The clinical review criteria expressed below reflects how ConnectiCare determines whether certain services or supplies are medically necessary. ConnectiCare established the clinical review criteria based upon a review of currently available clinical information (including clinical outcome studies in the peer-reviewed published medical literature, regulatory status of the technology, evidence-based guidelines of public health and health research agencies, evidence-based guidelines and positions of leading national health professional organizations, views of physicians practicing in relevant clinical areas, and other relevant factors). ConnectiCare, Inc. expressly reserves the right to revise these conclusions as clinical information changes, and welcomes further relevant information. Identification of selected brand names of devices, tests and procedures in a medical coverage policy is for reference only and is not an endorsement of any one device, test or procedure over another. Each benefit plan defines which services are covered. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered and/or paid for by ConnectiCare, as some plans exclude coverage for services or supplies that ConnectiCare considers medically necessary. If there is a discrepancy between this guideline and a member's benefits plan, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of the State of CT and/or the Federal Government. Coverage may also differ for our Medicare members based on any applicable Centers for Medicare & Medicaid Services (CMS) coverage statements including including National Coverage Determinations (NCD), Local Coverage Determinations (LCD) and/or Local Medical Review Policies(LMRP). All coding and web site links are accurate at time of publication.

[Skip Background/Definitions and go directly to Guideline](#)

Background

Chest wall deformities result from abnormal growth of the rib cartilages which pushes the sternum either inward or outward, away from the plane of the chest. The deformities can range from mild, symmetric indentions or protrusions, to severe asymmetric deformities. The appearance of the deformity often changes dramatically around the time of adolescent growth. Chest wall deformities may be corrected using various techniques; most require surgical intervention.

Definitions

Pectus carinatum (PC)	<p>Pectus carinatum (i.e., pigeon breast or chicken breast) is a congenital chest deformity characterized by an anterior protrusion deformity of the sternum and costal cartilages. PC is typically not confirmed until after the growth spurts of early adolescence. This deformity produces a rigid chest and, while symptoms are uncommon, it may result in inefficient respiration as a result of the restrictive chest formation. Three types of PC-related defects have been identified:</p> <ul style="list-style-type: none">• Anterior displacement of the body of the sternum and symmetrical concavity of the costal cartilages
------------------------------	--

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

	<ul style="list-style-type: none"> • Lateral depression of the ribs on one or both sides of the sternum • Pouter pigeon breast (least common deformity) — a defect that consists of an upper or chondromalacial prominence with protrusion of the manubrium and depression of the sternal body <p>The degree of physiological impairment is related to the degree of chest deformity. Patients with PC may develop symptoms as a result of restricted air exchange; complete expiration of air from the lungs may not occur. In addition, pain may result from the secondary pressures that develop from the overgrowth of cartilage. Other conditions that may be associated with PC include frequent respiratory infections, asthma, rickets, mitral valve disease, Marfan’s syndrome, scoliosis and other cardiac changes.</p>
<p>Pectus excavatum (PE)</p>	<p>Pectus excavatum is a posterior depression of the sternum and adjacent costal cartilages; often a cosmetic defect, but which may have varied anatomic and symptomatic presentations.</p> <p>Surgical correction of pectus excavatum improves physical appearance in most patients and cardiorespiratory function in some, but the indications for intervention are not fully standardized.</p> <p>Standard PE surgical procedures; e.g.:</p> <ul style="list-style-type: none"> • Ravitch procedure — standard open surgical technique that involves removing the ends of the ribs in the area that is depressed at the sternum. The sternum is then straightened out at the point it turns downward by breaking it horizontally. Stitches and a metal bar are used to hold the sternum in place under the skin. After two to three years, when remodeling has taken place, the bar may be removed. • Nuss procedure (aka minimally invasive repair of pectus excavatum [MIRPE]) — closed procedure that corrects the pectus defect without cartilage resection by applying outward pressure to the sternum at the point of maximal inward deflection using a custom-contoured steel bar ("Nuss bar"). The Nuss bar is placed in the pleural space, passed behind the sternum, rotated 180 degrees, and then attached laterally to the outer edge of the rib cage. The bar is left in place for several months or years. <p>Investigational PE treatment approaches (see Limitations/Exclusions); e.g.:</p> <ul style="list-style-type: none"> • Sternal magnet (Magnetic Mini Mover procedure) — designed to lift the sternum using magnetic attraction between a magnet attached to the sternum and another magnet on an external sternal brace. • Sternal suction — suction applied externally to the sternum to reduce sternal depression by about 1 cm per month. The suction device is used for one or more hours daily for 12 to 15 months. The device has also been used as an adjunct to conventional surgical correction.
<p>Poland Syndrome</p>	<p>Poland syndrome (i.e., Poland’s anomaly, Poland’s syndactyly) — rare congenital disorder associated with lateral depression of the ribs on one or both sides of the sternum. The right side of the body is affected twice as often as the left. When the anomaly occurs on the left side of the body, the heart and lungs are vulnerable, because they may be covered only by skin, fascia and pleura.</p> <p>Although the anomaly is associated with a wide range of malformations, the condition is characterized by absence or hypoplasia of the pectoralis major muscle, absence or hypoplasia of the pectoralis minor muscle, absence of costal cartilages, hypoplasia of the breast and subcutaneous tissue, and a variety of hand and upper-extremity anomalies.</p> <p>In cases of severe cartilage deficiency, patients may develop lung hernia and paradoxical respiratory motion. In less severe cases, patients may develop a simple flattening of the anterior chest wall.</p>

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

	Poland syndrome surgery techniques include, but may not be limited to: augmentation with tissue from the opposite breast, musculocutaneous flap to fill hollow space on the exterior of the chest, prosthetic augmentation, and surgical repair of the chest wall.
Haller Index Aka pectus index (PI) or pectus severity index (PSI)	<p>The Haller index, also called the pectus index (PI) or pectus severity index (PSI), is the most commonly used scale for determining the severity of chest wall deformities.</p> <p>The index is defined as the width of the chest divided by the distance between the sternum and spine at the point of maximal depression.</p> <p>The normal value is 2.54. In individuals with PE, a lower PSI indicates a more severe deformity in contrast to individuals with excavatum, in which a higher PSI indicates a more severe deformity. An index greater than 3.25 is considered severe for PE. Computerized tomography (CT) or magnetic resonance imaging (MRI) may be used to determine the index.</p>

Related Medical Guidelines

[Breast Implants and Reconstruction](#)

[Cosmetic Surgery Procedures](#)

Guidelines

Note: Coverage for the surgical repair of a chest wall deformity is dependent upon benefit plan language, may be subject to the provisions of a cosmetic and/or reconstructive surgery benefit and may be governed by state/federal mandates. Under many benefit plans, surgery for a chest wall deformity is not covered when performed solely for the purpose of improving or altering appearance or self-esteem or to treat psychological symptomatology or psychosocial complaints related to one's appearance. This includes, but is not limited to, treatments, drugs, products, hospital/facility charges, anesthesia, pathology/lab fees, radiology fees and professional fees by the surgeon, assistant surgeon, consultants and attending physicians

- I. Surgical procedures performed solely for cosmetic/psychological reasons are not considered medically necessary. ([See Limitations/Exclusions](#))

- II. Surgical procedures performed to correct physiologic complications of Pectus Excavatum, Pectus Carinatum, or Poland syndrome are considered medically necessary and reconstructive when the following criteria are met:
 - A. Functional impairment documented by one of the following:
 1. Decreased cardiac output and/or abnormal pulmonary function during exercise
 2. Anticipation of future cardiovascular compromise
 3. Signs or symptoms that impair the member's ability to participate in Usual activities (i.e., shortness of breath [dyspnea] at rest or on exertion)
 4. Arrhythmias or clinical stigmata of decreased cardiac output

AND
 - B. The procedure is expected to correct the functional impairment

AND

 - C. The anatomical criterion for the condition is met:
 1. For treatment of PE, the Haller Index is ≥ 3.25
 2. For treatment of PC, the Haller Index is ≤ 2.0
 3. For treatment of Poland syndrome, when rib formation is absent

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

Limitation/Exclusion

- I. ConnectiCare does not consider surgery for chest wall deformities to be medically necessary when performed for any of the following reasons:
 - A. Improve/alter appearance
 - B. Increase self-esteem
 - C. Treat psychological symptomatology or psychosocial complaints

- II. Bracing and surgical procedures to correct PC are considered cosmetic and not medically necessary when the deformity does not cause physiologic disturbances from compression of the heart or lungs.

- III. The following surgical procedures for PE are not considered medically necessary due to insufficient evidence of therapeutic value and are therefore not covered:
 - A. Magnetic Mini Mover Procedure (3MP)
 - B. Sternal suction (e.g., The Vacuum Bell)

Applicable Procedure Codes

PECTUS EXCAVATUM

21740	Reconstructive repair of pectus excavatum or carinatum; open
21742	Reconstructive repair of pectus excavatum or carinatum; minimally invasive approach (Nuss procedure), without thoracoscopy
21743	Reconstructive repair of pectus excavatum or carinatum; minimally invasive approach (Nuss procedure), with thoracoscopy

Applicable ICD-10 Codes

J44.9	Chronic obstructive pulmonary disease, unspecified
J98.4	Other disorders of lung
Q67.6	Pectus excavatum
R94.2	Abnormal results of pulmonary function studies

Applicable Procedure Codes

PECTUS CARINATUM

21740	Reconstructive repair of pectus excavatum or carinatum; open
21742	Reconstructive repair of pectus excavatum or carinatum; minimally invasive approach (Nuss procedure), without thoracoscopy
21743	Reconstructive repair of pectus excavatum or carinatum; minimally invasive approach (Nuss procedure), with thoracoscopy

Applicable ICD-10 Codes

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

Q67.7	Pectus carinatum
--------------	------------------

Applicable Procedure Codes

POLAND SYNDROME

15734	Muscle, myocutaneous, or fasciocutaneous flap; trunk
15756	Free muscle or myocutaneous flap with microvascular anastomosis
20900	Bone graft, any donor area; minor or small (e.g., dowel or button)
20902	Bone graft, any donor area; major or large

Applicable ICD-10 Codes

Q79.8	Other congenital malformations of musculoskeletal system
--------------	--

References

Actis Dato GM, De Paulis R, Actis Dato A, et al. Correction of pectus excavatum with a self-retaining seagull wing prosthesis. Long-term follow-up. *Chest*. 1995;107(2):303-306.

Baban A, Torre M, Bianca S, et al. Poland syndrome with bilateral features: Case description with review of the literature. *Am J Med Genet A*. 2009;149A(7):1597-1602

Banever GT, Konefal SH, Gettens K, Moriarty KP. Nonoperative correction of pectus carinatum with orthotic bracing. *J Laparoendosc Adv Surg Tech A*. 2006;16(2):164-167.

Borschel GH, Izenberg PH, Cederna PS. Endoscopically assisted reconstruction of male and female poland syndrome. *Plast Reconstr Surg*. 2002;109(5):1536-1543.

Coelho Mde S, Guimarães Pde S. Pectus carinatum. *J Bras Pneumol*. 2007 Aug;33(4):463-74.

Coelho Mde S, Silva RF, Bergonse Neto N, et al. Pectus excavatum surgery: Sternochondroplasty versus Nuss procedure. *Ann Thorac Surg*. 2009;88(6):1773-1779.

Coskun ZK, Turgut HB, Demirsoy S, Cansu A. The prevalence and effects of pectus excavatum and pectus carinatum on the respiratory function in children between 7-14 years old. *Indian J Pediatr*. 2010;77(9):1017-1019.

de Matos AC, Bernardo JE, Fernandes LE, Antunes MJ. Surgery of chest wall deformities. *Eur J Cardiothorac Surg*. 1997;12(3):345-350.

de Oliveira Carvalho PE, da Silva MV, Rodrigues OR, Cataneo AJ. Surgical interventions for treating pectus excavatum. *Cochrane Database Syst Rev*. 2014;10:CD008889.

Egan JC, DuBois JJ, Morphy M, et al. Compressive orthotics in the treatment of asymmetric pectus carinatum: A preliminary report with an objective radiographic marker. *J Pediatr Surg*. 2000;35(8):1183-1186.

Ellis DG, Snyder CL, Mann CM. The 're-do' chest wall deformity correction. *J Pediatr Surg*. 1997;32(9):1267-1271. Ellis DG. Chest wall deformities. *Pediatr Rev*. 1989;11(5):147-151.

Erdogan A, Ayten A, Oz N, Demircan A. Early and long-term results of surgical repair of pectus excavatum. *Asian Cardiovasc Thorac Ann*. 2002;10(1):39-42.

Esteves E, Paiva KC, Calcagno-Silva M, et al. Treatment of pectus excavatum in patients over 20 years of age. *J Laparoendosc Adv Surg Tech A*. 2011;21(1):93-96.

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

- Fekih M, Mansouri-Hattab N, Bergaoui D, et al. Correction of breast Poland's anomalies. About eight cases and literature review. *Ann Chir Plast Esthet.* 2010;55(3):211-218.
- Fitjakowska M, Antoszewski B. Surgical treatment of patients with Poland's syndrome - Own experience. *Pol Przegl Chir.* 2011;83(12):662-667.
- Fonkalsrud EW, Beanes S. Surgical management of pectus carinatum: 30 years' experience. *World J Surg.* 2001;25(7):898- 903.
- Fonkalsrud EW, DeUgarte D, Choi E. Repair of pectus excavatum and carinatum deformities in 116 adults. *Ann Surg.* 2002;236(3):304-312; discussion 312-314.
- Fonkalsrud EW, Dunn JC, Atkinson JB. Repair of pectus excavatum deformities: 30 years of experience with 375 patients. *Ann Surg.* 2000;231(3):443-448.
- Fonkalsrud EW, Salman T, Guo W, et al. Repair of pectus deformities with sternal support. *J Thorac Cardiovasc Surg.* 1994;107:37-42.
- Frantz FW. Indications and guidelines for pectus excavatum repair. *Curr Opin Pediatr.* 2011;23(4):486-491.
- Freitas Rda S, Tolazzi AR, Martins VD, et al. Poland's syndrome: Different clinical presentations and surgical reconstructions in 18 cases. *Aesthetic Plast Surg.* 2007;31(2):140-146.
- Gatti JE. Poland's deformity reconstructions with a customized, extrasoft silicone prosthesis. *Ann Plast Surg.* 1997;39(2):122-130.
- Goretsky M, Kelly R, Croitoru D, Nuss D. Chest wall anomalies: Pectus excavatum and pectus carinatum. *Adolescent Med Clinic.* 2004;15(3):455-471.
- Goretsky MJ, Kelly RE Jr, Croitoru D, Nuss D. Chest wall anomalies: Pectus excavatum and pectus carinatum. *Adolesc Med Clin.* 2004;15(3):455-471.
- Guntheroth WG, Spiers PS. Cardiac function before and after surgery for pectus excavatum. *Am J Cardiol.* 2007;99(12):1762-1764.
- Haecker FM, Mayr J. The vacuum bell for treatment of pectus excavatum: An alternative to surgical correction? *Eur J Cardiothorac Surg.* 2006;29(4):557-561.
- Haecker FM. The vacuum bell for conservative treatment of pectus excavatum: The Basle experience. *Pediatr Surg Int.* 2011;27(6):623-627.
- Haje SA. Pectus carinatum successfully treated with bracing -- a case report. *Int Orthop.* 1995;19(5):332-333.
- Haller JA Jr, Kramer SS, Lietman SA. Use of CT scans in selection of patients for pectus excavatum surgery: A preliminary report. *J Pediatr Surg.* 1987;22(10):904-906.
- Haller JA Jr, Scherer LR, Turner CS, et al. Evolving management of pectus excavatum based on a single institutional experience of 664 patients. *Ann Surg.* 1989;209(5):578-582.
- Hamdi M, Blondeel P, Van Landuyt K, et al. Bilateral autogenous breast reconstruction using perforator free flaps: A single center's experience. *Plast Reconstr Surg.* 2004;114(1):83-89; discussion 90-92.
- Harrison MR, Estefan-Ventura D, Fechter R, et al. Magnetic Mini-Mover Procedure for pectus excavatum: I. Development, design, and simulations for feasibility and safety. *J Pediatr Surg.* 2007;42(1):81-85; discussion 85-86.
- Harrison MR, Gonzales KD, Bratton BJ, et al. Magnetic mini-mover procedure for pectus excavatum III: Safety and efficacy in a Food and Drug Administration-sponsored clinical trial. *J Pediatr Surg.* 2012;47(1):154-159.
- Hodgkinson DJ. Re: Poland's deformity reconstruction with a customized extrasoft silicone prosthesis. *Ann Plast Surg.* 1998;40(2):194-195.

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)



- Hodgkinson DJ. The management of anterior chest wall deformity in patients presenting for breast augmentation. *Plast Reconstr Surg.* 2002;109(5):1714-1723.
- Jasonni V, Lelli-Chiesa PL, Repetto P, et al. Congenital deformities of the chest wall. Surgical treatment. *Minerva Pediatr.* 1997;49(9):407-413.
- Ji K, Luan J. Current development in therapy of congenital funnel chest. *Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi.* 2012;26(12):1516-1518.
- Johnson WR, Fedor D, Singhal S. Systematic review of surgical treatment techniques for adult and pediatric patients with pectus excavatum. *J Cardiothorac Surg.* 2014;9:25.
- Kaguraoka H, Ohnuki T, Itaoka T, et al. Degree of severity of pectus excavatum and pulmonary function in preoperative and postoperative periods. *J Thorac Cardiovasc Surg.* 1992;104:1483-1488.
- Karnak I, Tanyel FC, Tuncbilek E, et al. Bilateral Poland anomaly. *Am J Med Genet.* 1998;75(5):505-507.
- Kelly RE Jr, Cash TF, Shamberger RC, et al. Surgical repair of pectus excavatum markedly improves body image and perceived ability for physical activity: Multicenter study. *Pediatrics.* 2008;122(6):1218-1222.
- Kelly RE Jr, Shamberger RC, Mellins RB, et al. Prospective multicenter study of surgical correction of pectus excavatum: Design, perioperative complications, pain, and baseline pulmonary function facilitated by internet-based data collection. *J Am Coll Surg.* 2007;205(2):205-216.
- Kobayashi S, Yoza S, Komuro Y, et al. Correction of pectus excavatum and pectus carinatum assisted by the endoscope. *Plast Reconstr Surg.* 1997;99(4):1037-1045.
- Kobayashi S, Yoza S, Komuro Y, et al. Correction of pectus excavatum and pectus carinatum assisted by the endoscope. *Plast Reconstr Surg.* 1997;99(4):1037-1045.
- Kravarusic D, Dicken BJ, Dewar R, et al. The Calgary protocol for bracing of pectus carinatum: A preliminary report. *J Pediatr Surg.* 2006;41(5):923-926.
- Lee SY, Lee SJ, Jeon CW, Lee CS, Lee KR. Effect of the compressive brace in pectus carinatum. *Eur J Cardiothorac Surg.* 2008;34(1):146-149.
- Longaker MT, Glat PM, Colen LB, et al. Reconstruction of breast asymmetry in Poland's chest-wall deformity using microvascular free flaps. *Plast Reconstr Surg.* 1997;99(2):429-436.
- Lord MJ, Laurenzano KR, Hartmann RW Jr. Poland's syndrome. *Clin Pediatr (Phila).* 1990;29(10):606-609.
- Malek MH, Berger DE, Housh TJ, et al. Cardiovascular function following surgical repair of pectus excavatum: A metaanalysis. *Chest.* 2006;130(2):506-516.
- Malek MH, Berger DE, Marelich WD, et al. Pulmonary function following surgical repair of pectus excavatum: A meta-analysis. *Eur J Cardiothorac Surg.* 2006;30(4):637-643.
- Marks MW, Iacobucci J. Reconstruction of congenital chest wall deformities using solid silicone onlay prostheses. *Chest Surg Clin N Am.* 2000;10(2):341-355.
- Martinazzoli A, Cangemi V, Baccharini AE, et al. Poland syndrome. Problems of reconstructive and aesthetic surgery -- a clinical case. *G Chir.* 1995;16(11-12):497-501.
- Mavanur A, Hight DW. Pectus excavatum and carinatum: New concepts in the correction of congenital chest wall deformities in the pediatric age group. *Conn Med.* 2008;72(1):5-11.
- Mavanur A, Hight DW. Pectus excavatum and carinatum: New concepts in the correction of congenital chest wall deformities in the pediatric age group. *Conn Med.* 2008;72(1):5-11.
- Mayer OH. Pectus excavatum: Treatment. UpToDate [online serial]. Waltham, MA: UpToDate; reviewed February 2013. Mestak J, Zadorozna M, Cakrtova M. Breast reconstruction in women with Poland's syndrome. *Acta Chir Plast.* 1991;33(3):137-144.

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)

- Mielke CH, Winter RB. Pectus carinatum successfully treated with bracing. A case report. *Int Orthop*. 1993;17(6):350-352.
- Miller KA, Ostlie DJ, Wade K, et al. Minimally invasive bar repair for 'redo' correction of pectus excavatum. *J Pediatr Surg*. 2002;37(7):1090-1092.
- Morshuis W, Folgering H, Barentsz J, et al. Pulmonary function before surgery for pectus excavatum and at long-term follow-up. *Chest*. 1994;105(6):1646-1652.
- Morshuis WJ, Folgering HT, Barentsz JO, et al. Exercise cardiorespiratory function before and one year after operation for pectus excavatum. *J Thorac Cardiovasc Surg*. 1994;107:1403-1409.
- Morshuis WJ, Mulder H, Wapperom G, et al. Pectus excavatum: A clinical study with long term postoperative follow up. *Eur J Cardiothorac Surg*. 1992;6(6):318-328; discussion 328-329.
- Nasr A, Fecteau A, Wales PW. Comparison of the Nuss and the Ravitch procedure for pectus excavatum repair: A meta-analysis. *J Pediatr Surg*. 2010;45(5):880-886.
- National Institute for Clinical Excellence (NICE). Minimally invasive placement of pectus bar. *Interventional Procedure Guidance 3*. London, UK: NICE; July 2003.
- Nuchtern JG, Mayer OH. Pectus carinatum. *UpToDate* [online serial]. Waltham, MA: UpToDate; reviewed January 2014. Nuss D, Kelly RE Jr, Croitoru DP, et al. A 10-year review of a minimally invasive technique for the correction of pectus excavatum. *J Pediatr Surg*. 1998;33(4):545-552.
- Nuss D. Recent experiences with minimally invasive pectus excavatum repair 'Nuss procedure'. *Jpn J Thorac Cardiovasc Surg*. 2005;53(7):338-344.
- Pileggi AJ. Poland's syndrome. *Clin Pediatr (Phila)*. 1991;30(2):125.
- Protopapas AD, Athanasiou T. Peri-operative data on the Nuss procedure in children with pectus excavatum: Independent survey of the first 20 years' data. *J Cardiothorac Surg*. 2008;3:40.
- Quigley PM, Haller JA Jr, Jelus KL, et al. Cardiorespiratory function before and after corrective surgery in pectus excavatum. *J Pediatr*. 1996;128(5 Pt 1):638-643.
- Robicsek F, Watts LT, Fokin AA. Surgical repair of pectus excavatum and carinatum. *Semin Thorac Cardiovasc Surg*. 2009;21(1):64-75.
- Schalamon J, Pokall S, Windhaber J, Hoellwarth ME. Minimally invasive correction of pectus excavatum in adult patients. *J Thorac Cardiovasc Surg*. 2006;132(3):524-529.
- Schier F, Bahr M, Klobe E. The vacuum chest wall lifter: An innovative, nonsurgical addition to the management of pectus excavatum. *J Pediatr Surg*. 2005;40(3):496-500.
- Shamberger RC, Welch KJ. Cardiopulmonary function in pectus excavatum. *Surg Gynecol Obstet*. 1988;166:383-391.
- Shamberger RC, Welch KJ. Surgical correction of pectus carinatum. *J Pediatr Surg*. 1987;22(1):48-53.
- Shamberger RC. Congenital chest wall deformities. *Current problems in surgery*. 1996;23:471-542.
- Snajdauf J, Sintakova B, Fryc R, et al. Surgical treatment of pectus excavatum and pectus carinatum. *Cesk Pediatr*. 1993;48(10):581-585.
- Stavrev PV, Stavrev VP, Beshkov KN. Surgical correction of funnel chest. *Folia Med (Plovdiv)*. 2000;42(2):57-60.
- Stephenson JT, Du Bois J. Compressive orthotic bracing in the treatment of pectus carinatum: The use of radiographic markers to predict success. *J Pediatr Surg*. 2008;43(10):1776-1780.
- Swoveland B, Medvick C, Kirsh M, et al. The Nuss procedure for pectus excavatum correction. *AORN J*. 2001;74(6):828-841; quiz 842-845, 848-580.

Medical Policy: Surgical Correction of Chest Wall Deformities (Commercial)



Wilhelmi BJ, Cornette PB. Breast, Poland syndrome. eMedicine Plastic Surgery Topic 132. Omaha, NE: eMedicine.com; updated August 5, 2002.

Semin Pediatr Surg. 2018 Jun;27(3):175-182. doi: 10.1053/j.sempedsurg.2018.06.001. Epub 2018 Jun 15. Measured dynamic compression for pectus carinatum: A systematic review. de Beer SA1, Blom YE2, Lopez M3, de Jong JR2

Specialty matched clinical peer review.

Eur J Pediatr Surg. 2018 Aug;28(4):347-354. doi: 10.1055/s-0038-1667297. Epub 2018 Aug 15. Current Options for the Treatment of Pectus Carinatum: When to Brace and When to Operate?

Curr Opin Pediatr. 2013 Jun;25(3):375-81. doi: 10.1097/MOP.0b013e3283604088. Pectus carinatum. Desmarais TJ1, Keller MS.

Revision history

DATE	REVISION
11/19/2019	<ul style="list-style-type: none">Connecticare has adopted the clinical criteria of its parent corporation, EmblemHealthReformatted and reorganized policy, transferred content to new templateRemoved dynamic compression bracing from Limitations/Exclusions
10/12/2018	<ul style="list-style-type: none">Consolidated separate criteria sets for PE, PC and Poland syndrome into one criterion that emphasizes the presence of functional impairment and differentiated Haller Index parameters for PE and PC.
11/11/2016	<ul style="list-style-type: none">Coverage limitations removed for Poland Syndrome.