



# MASSACHUSETTS

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## Medical Policy

### Vertical Expandable Prosthetic Titanium Rib

#### Table of Contents

- [Policy: Commercial](#)
- [Policy: Medicare](#)
- [Authorization Information](#)
- [Coding Information](#)
- [Description](#)
- [Policy History](#)
- [Information Pertaining to All Policies](#)
- [References](#)

#### Policy Number: 305

New Policy Number: 7.01.110  
NCD/LCD: N/A

#### Related Policies

Interventions for Progressive Scoliosis, #[550](#)

#### Policy

#### Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO Blue<sup>SM</sup> and Medicare PPO Blue<sup>SM</sup> Members

Vertical expandable prosthetic titanium rib in the treatment of progressive thoracic insufficiency syndrome due to rib and/or chest wall abnormalities in infants/children between 6 months of age and skeletal maturity (about age 14 for girls and age 16 for boys) may be considered **MEDICALLY NECESSARY**.

#### Notes:

- Implantation of this device should be performed in specialized centers, given the complexity of these procedures and patients.
- Preoperative evaluation requires input from a pediatric orthopedist, pulmonologist, and thoracic surgeon. In addition, preoperative evaluation of nutritional, cardiac, and pulmonary function (when possible) is required.

Vertical expandable prosthetic titanium rib except for the indications noted above is **INVESTIGATIONAL**.

#### Prior Authorization Information

##### Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

##### Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	<b>Outpatient</b>
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<b>Commercial Managed Care (HMO and POS)</b>	Prior authorization is <b>not required</b> .
<b>Commercial PPO and Indemnity</b>	Prior authorization is <b>not required</b> .
<b>Medicare HMO Blue<sup>SM</sup></b>	Prior authorization is <b>not required</b> .
<b>Medicare PPO Blue<sup>SM</sup></b>	Prior authorization is <b>not required</b> .

## CPT Codes / HCPCS Codes / ICD Codes

*Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.*

*Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.*

## CPT Codes

There is no specific CPT code for this service.

## Description

Thoracic insufficiency syndrome (TIS) is the inability of the thorax to support normal respiration or lung growth. The condition results from serious defects affecting the ribs or chest wall, such as severe scoliosis, rib fusion (which may accompany scoliosis), and various hypoplastic thorax syndromes, such as Jeune syndrome and Jarcho-Levin syndrome. Spine, chest, and lung growth are interdependent.

Progressive TIS includes respiratory insufficiency, loss of chest wall mobility, worsening three-dimensional thoracic deformity, and/or worsening pulmonary function tests. As a child grows, progressive thoracic deformity and rotation toward the concave side occurs with worsening respiratory compromise. This progression is often accompanied by a need for supplemental oxygen and can require mechanical ventilation. While spinal fusion is one approach to treatment, it may not be successful and also may limit growth (lengthening) of the spine.

The vertical expandable prosthetic titanium rib (VEPTR) is an expandable curved rod placed vertically on the chest that helps to shape the thoracic cavity and spine while allowing growth. It is positioned either between ribs or between the ribs and either the spine or pelvis. The device is designed to be expanded every 4 to 6 months as growth occurs and also to be replaced if necessary. Some patients require multiple devices.

An example of a prosthetic titanium rib device for shaping the thoracic cavity and spine to allow growth is the VEPTR from Synthes Spine Company. All prosthetic titanium rib devices are considered investigational regardless of the commercial name, the manufacturer or FDA approval status except when used for the medically necessary indications that are consistent with the policy statement."

## Summary

No comparative trials have described the use of this device. Results from the series reported at different specialty centers demonstrate improvement and/or stabilization in key measures with use of this device in progressive TIS. This improvement is noted in measures related to thoracic structure (e.g., Cobb angle for those with scoliosis), growth of the thoracic spine and lung volumes, and stable or improved ventilatory status. While pulmonary function testing is very difficult in these patients, one study does demonstrate an age-specific increase in FVC, and the studies report a final FVC in the range of 50–70% of predicted value.

Given the usual disease course of worsening thoracic volume and ventilatory status, the stabilization/improvement in these measures would be highly unlikely in the absence of the intervention. Taken together, these various outcome measures demonstrate the positive impact of this procedure.

Thus, this intervention may be considered medically necessary in children with TIS due to rib and/or chest wall defects. Given the complexity of this procedure and the patient population, use of this device should be performed in specialized centers. Preoperative evaluation requires input from a pediatric orthopedist,

pulmonologist, and thoracic surgeon. In addition, preoperative evaluation of nutritional, cardiac, and pulmonary function (when possible) is required.

## Policy History

Date	Action
12/2016	New references added from BCBSA National medical policy.
7/2015	New references added from BCBSA National medical policy.
1/2014	Removed ICD-9 procedure code 78.51 as it does not meet the intent of the policy.
6/2013	New references from BCBSA National medical policy.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
6/1/2011	New policy effective 6/1/2011 describing covered and non-covered indications.
6/2011	Reviewed - Medical Policy Group – Orthopedics, Rehabilitation and Rheumatology. No changes to policy statement.

## Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

[Medical Policy Terms of Use](#)

[Managed Care Guidelines](#)

[Indemnity/PPO Guidelines](#)

[Clinical Exception Process](#)

[Medical Technology Assessment Guidelines](#)

## References

1. Campbell RM, Jr., Smith MD, Mayes TC, et al. The characteristics of thoracic insufficiency syndrome associated with fused ribs and congenital scoliosis. *J Bone Joint Surg Am.* Mar 2003;85-A(3):399-408. PMID 12637423
2. Campbell RM, Jr. VEPTR: past experience and the future of VEPTR principles. *Eur Spine J.* Mar 2013;22 Suppl 2:S106-117. PMID 23354777
3. U.S. Food and Drug Administration. Vertical Expandable Prosthetic Titanium Rib (VEPTR) - H030009. 2004; <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cftopic/pma/pma.cfm?num=H030009>. Accessed March, 2015.
4. Campbell RM, Jr., Smith MD, Mayes TC, et al. The effect of opening wedge thoracostomy on thoracic insufficiency syndrome associated with fused ribs and congenital scoliosis. *J Bone Joint Surg Am.* Aug 2004;86A(8):1659-1674. PMID 15292413
5. Flynn JM, Emans JB, Smith JT, et al. VEPTR to treat nonsyndromic congenital scoliosis: a multicenter, mid-term follow-up study. *J Pediatr Orthop.* Oct-Nov 2013;33(7):679-684. PMID 23812154
6. Gadepalli SK, Hirschl RB, Tsai WC, et al. Vertical expandable prosthetic titanium rib device insertion: does it improve pulmonary function? *J Pediatr Surg.* Jan 2011;46(1):77-80. PMID 21238644
7. Emans JB, Caubet JF, Ordonez CL, et al. The treatment of spine and chest wall deformities with fused ribs by expansion thoracostomy and insertion of vertical expandable prosthetic titanium rib: growth of thoracic spine and improvement of lung volumes. *Spine (Phila Pa 1976).* Sep 1 2005;30(17 Suppl):S58-68. PMID 16138067
8. Motoyama EK, Deeney VF, Fine GF, et al. Effects on lung function of multiple expansion thoracoplasty in children with thoracic insufficiency syndrome: a longitudinal study. *Spine (Phila Pa 1976).* Feb 1 2006;31(3):284290. PMID 16449900
9. Waldhausen JH, Redding GJ, Song KM. Vertical expandable prosthetic titanium rib for thoracic insufficiency syndrome: a new method to treat an old problem. *J Pediatr Surg.* Jan 2007;42(1):76-80. PMID 17208544
10. Skaggs DL, Sankar WN, Albrektson J, et al. Weight gain following vertical expandable prosthetic titanium ribs surgery in children with thoracic insufficiency syndrome. *Spine (Phila Pa 1976).* Nov 1 2009;34(23):2530-2533. PMID 19927103
11. Mayer OH, Redding G. Early changes in pulmonary function after vertical expandable prosthetic titanium rib insertion in children with thoracic insufficiency syndrome. *J Pediatr Orthop.* Jan-Feb 2009;29(1):35-38. PMID 19098643

12. White KK, Song KM, Frost N, et al. VEPTR growing rods for early-onset neuromuscular scoliosis: feasible and effective. *Clin Orthop Relat Res.* May 2011;469(5):1335-1341. PMID 21213088
13. Farley FA, Li Y, Jong N, et al. Congenital scoliosis SRS-22 outcomes in children treated with observation, surgery, and VEPTR. *Spine (Phila Pa 1976).* Oct 15 2014;39(22):1868-1874. PMID 25099323
14. Waldhausen JH, Redding G, White K, et al. Complications in using the vertical expandable prosthetic titanium rib (VEPTR) in children. *J Pediatr Surg.* Nov 2016;51(11):1747-1750. PMID 27397045