

An Anatomic Study of the C8 and T1 Nerve Roots Related to Dorsal T1 Corpectomy and Ventral Reconstruction with an Expandable Cage

Rick Placide MD, PT; Mark Moldavsky MS; Noelle F Klocke MS; Brandon Bucklen PhD
1 West End Orthopedics Clinic; Richmond, VA
2 Globus Medical Inc.; Audubon, PA



Learning Objectives

Posterior transpedicular approaches are used to treat thoracic spinal trauma, deformity, tumors and infection with circumferential decompression and fixation. This approach may be hindered at T1, where the vertebrectomy window is smaller, and preservation of the nerve roots is essential. The goals of this study are to better understand 1) the superior-inferior nerve root distance of C8 to T1, and 2) how that distance changes after a corpectomy and spacer expansion.

Introduction

Decompression in the upper thoracic region can be challenging due to ventral access. The posterior transpedicular approach provides potential for circumferential decompression and stabilization, but may be limited at the T1 level, due to insufficient spacing between exiting roots.

Methods

Four specimens were used; C7 and T1 laminectomies exposed the spinal cord and C8-T1 nerve roots (Figure 1). Lateral mass screws and pedicle screws (ELLIPSE®; Globus Medical Inc.; Audubon, PA) were placed from C5 to T2 contralateral to the planned spacer insertion side to maintain spinal column stability

Disclosure

R.P.: nothing to disclose

M.M., N.K., and B.B.: Globus Medical Inc. employees

(ELLIPSE®; Globus Medical Inc.; Audubon, PA) is

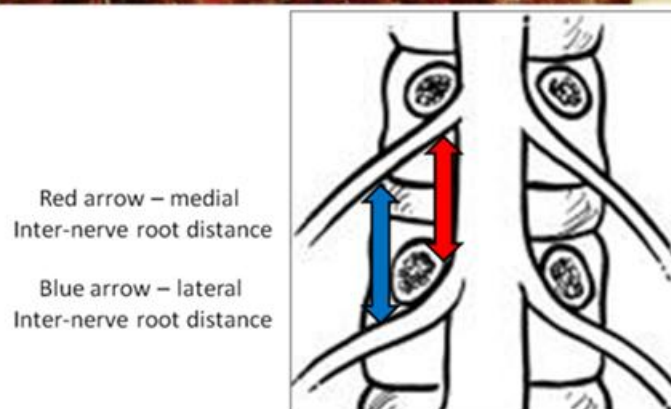
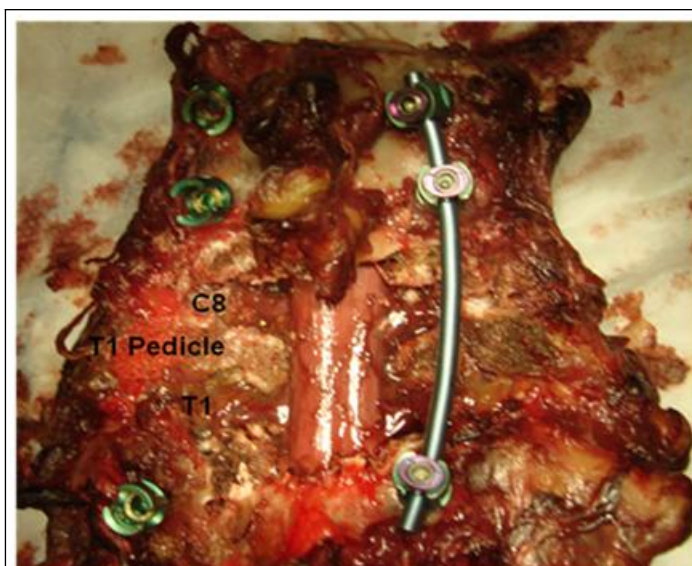


Figure 1: Top) C8 and T1 nerve roots exposed, Bottom) superior-inferior nerve root distance measurements.

Methods cont.

The superior-inferior nerve root distance was measured between the axilla of the C8 root and the shoulder of the T1 root (medial) and at the lateral edge of the T1 pedicle (lateral) with the use of calipers. Using a burr, a T1 corpectomy was performed by following the path of the pedicles. The medial and lateral C8-T1 nerve root dimensions were measured again. Finally an expandable spacer trial was inserted to the center of the corpectomy defect and expanded to a tight fit. One more measurement of the nerve roots was taken.

Results

The medial nerve root distance pre-corpectomy, post-corpectomy, and post-expansion for the left nerve roots is 13.9 ± 1.4 mm, 14.4 ± 2.0 mm, and 13.5 ± 2.2 mm respectively, and for the right nerve roots 11.9 ± 2.6 mm, 12.5 ± 1.9 mm, and 12.8 ± 1.0 mm, respectively. The lateral nerve root distance of the left nerve roots for the same groups are 13.7 ± 2.2 mm, 13.1 ± 2.3 mm, and 13.9 ± 2.4 mm respectively, and for the right nerve roots 13.2 ± 1.8 mm, 12.7 ± 1.2 mm, and 13.5 ± 1.1 mm, respectively

Conclusions

On average a nerve-root spacing of 12.7mm–13.9mm between C8 and T1. Spacers should be chosen with consideration of these distances, and when inappropriate, ventral reconstruction with an expandable spacer should not be used in