Postoperative Outcomes of Ponte Osteotomy vs No Osteotomy in the Treatment of Thoracic Adolescent Idiopathic Scoliosis (AIS) – A Randomized Clinical Trial

Matti M Ahonen[1], Johanna Maria Syvänen, Linda Linnea Helenius, Tanja Marika Perokorpi[2], Jenni Jalkanen, Aarno Yrjänä Nietosvaara[3], Ilkka J. Helenius[4]

[1]Helsinki University Hospital, [2]Department of Paediatric Surgery, Orthopaedics and Traumatology, [3]Children's Hospital, [4]Turku University Central Hospital

INTRODUCTION:

Ponte osteotomies (PO) are routinely used to facilitate curve correction in surgical correction of adolescent idiopathic scoliosis (AIS). Data regarding routine use of PO is controversial, with conflicting data for coronal and sagittal plane correction and clinical benefit. The use of PO has not been studied in the surgical treatment of AIS in a randomized clinical trial.

METHODS:

A randomized, multicenter clinical trial on adolescents undergoing posterior spinal fusion for thoracic idiopathic scoliosis using pedicle screw instrumentation. Fifty-two consecutive AIS patients (mean 15.6 years old), scheduled for segmental pedicle screw instrumentation for AIS were prospectively randomized in 1:1 ratio to PO (n=26) and non-PO (n=26) groups after surgical exposure of the spine. PO group received a minimum two and maximum four Ponte osteotomies in the apical area of the deformity. Pre- and postoperative radiographs were analyzed. Data on blood loss, surgical time, and complications were prospectively collected.

RESULTS:

Mean (SD) preoperative major curve was 5p>

	Non-Ponte osteotomy (n=26)	Ponte osteotomy (n=26)	P-value
Preoperative Main Thoracic Curve	53.8° (7.4°)	54.2° (11.6°)	0.89
Postoperative Main Thoracic Curve	17.8° (5.5°)	16.8° (5.3°)	0.61
Preoperative Proximal Thoracic Curve	30.0° (12.1°)	26.1° (11.3°)	0.25
Postoperative Proximal Thoracic Curve	14.2° (7.1°)	13.3° (6.1°)	0.70
Preoperative Lumbar Curve	36.9° (12.4°)	34.2° (11.2°)	0.56
Postoperative Lumbar Curve	12.9° (5.6°)	13.4° (6.0°)	0.72
Preoperative Thoracic Kyphosis	18.3° (13.3°)	15° (9.7°)	0.36
Postoperative Thoracic Kyphosis	17.5° (7°)	20° (4.5°)	0.066
Change in Thoracic Kyphosis (°)	-0.13 (11.8)	+6.1 (9.4)	0.020
Postoperative kyphosis 20°-40° (%,n/n)	23% (6/26)	54% (14/26)	0.023
Preoperative Lumbar Lordosis	45.3° (12.0°)	43.4° (8.5°)	0.95
Postoperative Lumbar Lordosis	43.0° (11.8°)	43.3° (14.5°)	0.95
Fused vertebrae	11.4 (1.6)	11.5 (1.6)	0.75
Screw density	1.96 (0.084)	1.98 (0.058)	0.43
Number of Ponte osteotomies	N/A	2.8 (0.7)	N/A
Blood loss (ml)	654 (398)	665 (333)	0.89
Surgical time (min)	151 (24)	160 (54)	0.30