

Trends in Tether Usage for Proximal Junctional Kyphosis Prophylaxis in Adult Deformity

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INTRODUCTION:

PJK is a common complication of adult spinal deformity (ASD) surgery, occurring in 10-48% of cases, leading to reoperation in 10-25%. This study examines temporal trends in tether prophylaxis usage, target population characteristics, and tethering effectiveness in preventing PJK.

METHODS: Included ASD patients with UIV between T1-T6 (UT) or T9-L1 (LT) and LIV at the pelvis. Patients grouped by PJK prophylaxis type NONE, TETHER, OTHER (cement or hooks) for trend analysis. Then patients with 2-year follow up (2Y) were further grouped based on UIV location (UT, LT) and demographics, radiographic parameters, and rate of PJK/PJF were compared between both UT/LT TETHER and NONE groups in Good and Bad alignment based on UIV spinopelvic inclination (UIVSPi) < 15° at 6wks. PJF was defined by Lafage radiographic criteria.

RESULTS:

Prevalence analysis included 1141 patients: 538 NONE, 328 TETHER, and 275 OTHER. Prophylaxis utilization rose from 40 to 62% between 2008-2022, with the TETHER going from 0 to 37%.

687 patients had 2Y follow up: 126 TETHER with 45 UT and 81 LT. TETHER were older (NONE:62±10,TETHER:66±8yo), frailer (3.6±1.5,3.7±1.4), and more osteoporotic (14.4,28.6%), p<.012. Rate of prior spine surgery (57.0,60.0%,p>.05) was similar but TETHER had more osteotomies (74.2,88.9%,p<.001). When looking at TETHER vs. NONE without factoring alignment, there were similar rates of PJK (54.5,48.3%), PJF (27.3,23.3%), and PJF reop (1.7,2.2%), p>.5. Malaligned patients at 6 weeks had the highest PJK, PJF and PJF reop (58%, 32%, and 4.3%) when they had no TETHER. Aligned patients with TETHER had the lowest PJF reop vs. Bad alignment and TETHER at 2y (6.9% vs. 0%, p<0.05).

DISCUSSION AND CONCLUSION:

PJK prophylaxis use surged (40-77%) from 2008-2022, with tethers showing rapid growth from 0% in 2008 to 37% of cases performed in 2022. At 2 years, more than 1 in 2 patients with malalignment and no Tethers had PJK. On the other hand, no aligned patient with tether had reoperations for PJF. These findings shed light on evolving PJK prophylaxis trends and outcomes linked to tether usage with emphasis of proper sagittal alignment.

Temporal Trends in PJK Prophylaxis Utilization

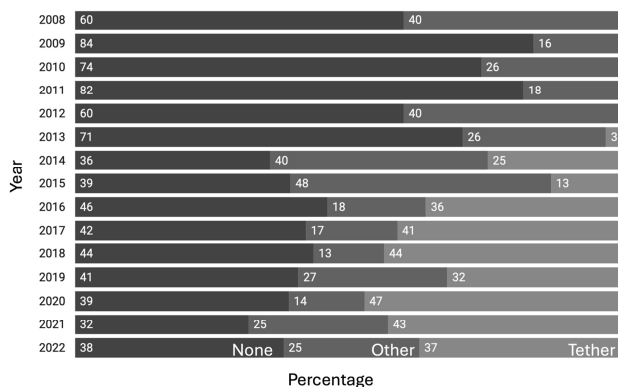


Figure: Temporal Trends in PJK Prophylaxis Utilization. Percentage of patients without prophylaxis (None), with hooks or cement (Other), and tethers (Tether) is represented per year