

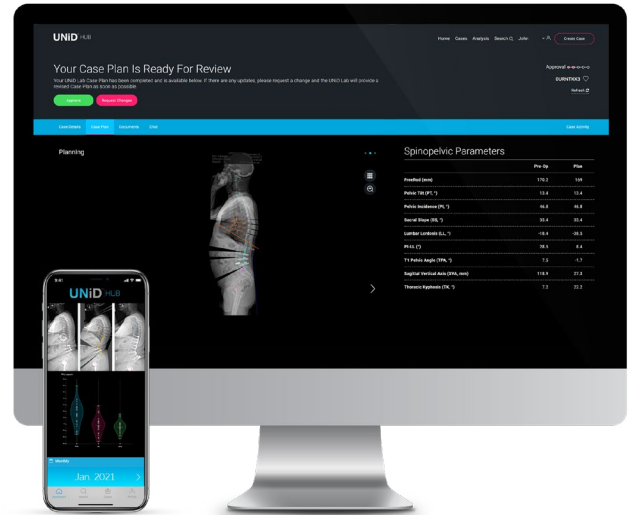
Addressing PJK/PJF Through a Multifactorial Approach

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Joravar Dhaliwal, MD and Stephanus Viljoen, MD

Despite good clinical outcomes, surgical treatment of patients with adult spinal deformity can be challenging. Despite successfully achieving operative goals, complications are common, with proximal junctional kyphosis (PJK) being one of the most significant concerns. PJK was first described in literature in 2005 and its incidence ranges from 17% to 61.7%, making it a topic of extensive study¹. Severe cases of PJK can progress to proximal junctional failure (PJF) which necessitate additional surgery.

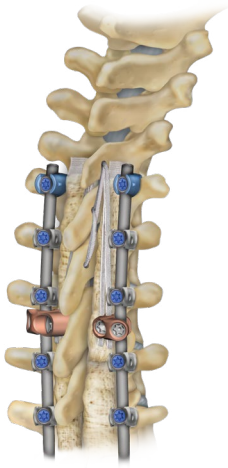
The causes of this condition can be categorized into patient risk factors, radiographic risk factors, and surgical risk factors. Patient-related factors include elevated body mass index and osteopenia, while radiographic evaluation focuses on high thoracic kyphosis and proximal junctional angle as significant risk factors¹. Surgical risk factors, on the other hand, are particularly modifiable and encompass factors such as the choice of upper and lower instrumented vertebrae, instrument rigidity, integrity of posterior soft tissues, and the degree of deformity correction¹.



At our institution, PJK and PJF is unfortunately frequently encountered due to the institution's nature as a tertiary referral center. Many of our patients have had prior spine surgery in the community and present iatrogenic deformity, necessitating complex revisions. Additionally, regional demographic factors, including high levels of obesity, contribute to the incidence of PJK and PJF². Mitigating the risk of PJK requires a tailored and multimodal approach. Preoperative counseling for weight loss and collaboration with endocrinologists to address low bone density can optimize patients for surgical success. Optimization of spinal alignment is also an important factor to prevent PJK/PJF. Enabling technologies like Medtronic's UNiD™ ASI platform can aid in planning correction, provide patient-specific implants, and leverage machine learning to anticipate reciprocal changes in the unfused spine.

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In addition to patient optimization and meticulous planning, surgical technique is of paramount importance to prevent PJK/PJF.

Care must be taken during dissection to prevent damage to proximal ligamentous tissues. Additionally, ligament augmentation with Medtronic's LigaPASS™ 2.0 posterior tension band system helps to reinforce patient anatomy, which is critical for maintenance of the biomechanical integrity of the transition zone after spinal fusion.

While research on PJK/PJF is ongoing and necessary to quantify the benefits and risks of the techniques discussed above, the breadth of Medtronic's portfolio allows surgeons the flexibility to develop strategies that fit the specific needs of their patients and address the multifactorial risks present in adult spinal deformity procedures.

For more information on the ligament augmentation technique, please visit [medtronic.com/ligamentaugmentation](https://www.medtronic.com/ligamentaugmentation)

References:

1. Kim, Han Jo, and Sravisht Iyer. "Proximal junctional kyphosis." *JAAOS-Journal of the American Academy of Orthopaedic Surgeons* 24.5 (2016): 318-326.
2. "Adult Obesity Prevalence Maps" *Centers for Disease Control and Prevention*, May, 2023, <https://www.cdc.gov/obesity/data/prevalence-maps.html>