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Postsurgical pain in children: Unraveling the interplay between child and parent psychosocial factors

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Spinal fusion surgery is performed on about 10,000 children annually in the U.S. [15]. A recent systematic review identified prevalence of chronic postsurgical pain (CPSP) ranging from 11 to 54% after pediatric spinal fusion [14]. CPSP is associated with significant functional disability and impaired health-related quality of life in youth [13]. Thus, research that can lead to identifying youth at risk for the transition from acute postsurgical pain to chronic postsurgical pain is a critical research question in this field. Currently, there are few high quality research studies investigating this topic, but findings suggest that parent and child psychosocial factors place children at risk for CPSP. In recognition of the importance of family and parent factors in understanding and treating pediatric pain [11] we suggest here that in the context of surgery it is also critical to understand how child and parent factors interact to maintain pain over time.

In this issue of *PAIN*, Birnie et al. [1] take an important step in investigating the cross-sectional and longitudinal relationship among child and parent reports of pain catastrophizing and pain intensity related to spinal fusion. The actor-partner interdependence model (APIM) was used to measure bidirectional effects in the child-parent dyads. The primary results reported by Birnie et al. are 1) significant cross-sectional relationships at baseline and follow-up between child, but not parent, pain catastrophizing and children's pain intensity, 2) a *lack* of longitudinal relationships between baseline child and parent pain catastrophizing and children's postoperative pain intensity, and 3) only moderate stability in child and parent pain catastrophizing from baseline to follow-up, with significantly lower stability of this construct in children than parents.

While other studies have not used the APIM to analyze data, they have examined parent-child relationships finding significant cross-sectional associations between child and parent pain catastrophizing [6,12] and significant longitudinal relationships between baseline child [6] and parent [10,12,13] pain catastrophizing and postoperative pain intensity. There are several possible reasons for these contrasting results, including differences in study design and perioperative care models within which studies were conducted. As discussed by Birnie

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et al., questions have specifically been raised regarding timing of pain catastrophizing assessment in the perioperative setting (i.e. pre- vs. post-surgery), when pain catastrophizing might be evolving in response to the experience of intense pain [8]. However, we posit that the inconsistency of findings between studies may rather indicate that psychosocial constructs beyond pain catastrophizing are important and have been overlooked. For example, research in children with chronic pain has found that higher parent protectiveness, distress, and fear of pain are associated with higher child pain-related disability [3,9]. The relationship of a broader range of parent emotions, behaviors, and cognitions with children's postoperative pain should be explored.

Related, there has been limited application of theory to guide research on child psychosocial factors in the perioperative setting, and an overreliance on constructs deemed relevant for adults. There has been a large focus on pain catastrophizing in the perioperative setting despite several notable limitations. First, the Pain Catastrophizing Scale, originally developed in adults with chronic pain [16] and then later adapted for children with chronic pain [4] and their parents [7], has not been validated in the perioperative setting with children or parents and may not be relevant to children during the preoperative or acute postoperative periods. Indeed, Birnie et al. found a lack of stability in pain catastrophizing over time, particularly in children. Second, as Eccleston et al. [5] have argued pain catastrophizing may not be a developmentally appropriate construct to assess in youth with pain due to the different ways that children think about pain compared to adults, and may require other measures of emotional coping. Third, the primary focus on pain catastrophizing may divert us away from other important child cognitive, emotional, and behavioral factors, which may be linked to persistence of pain and disability. Unfortunately, this has likely hindered our progress in addressing this major health issue for children.

Although dyadic interactions between parent and child are considered key in the maintenance of pain, very limited methodologies for understanding these interactions have been employed in the perioperative setting thus far. Observational methodology may be needed to capture the richness of dyadic interactions, rather than relying on self-report questionnaires [11]. For example, Caes et al. [2] coded parent-child interactions before and after minor procedures in children undergoing cancer treatment to explore parental responses to child procedural pain and their impact on child experiences, finding significant interactions between parent distress and behavioral responses, and children's distress and pain behaviors. Similar approaches may be fruitful in the surgical setting to disentangle these complex interactions.

While Birnie et al. take an important step in examining the interpersonal processes between child and parent psychosocial risk factors around surgery, we have a long way to go in unravelling reciprocal interactions among child and parent psychosocial processes during the perioperative period and how these factors influence maintenance of pain. This research will be critical to informing targets and timing of intervention for these youth and their families.

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