# Pain in Children Following Microsurgical Reconstruction for Obstetrical Brachial Plexus Palsy

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**Purpose** To determine the prevalence and characteristics of pain experienced by children who have had microsurgical reconstruction for obstetrical brachial plexus palsy (OBPP).

**Methods** A prospective case series study was conducted of 65 children aged 6 to 18 years with a diagnosis of OBPP and who had microsurgery at less than 12 months of age with nerve grafting or transfer. A total of 28 patients (43%) had upper OBPP and 37 (57%) had total OBPP. We evaluated pain using the Faces Pain Scale−Revised and the Adolescent Pediatric Pain Tool. Sensory symptoms in the affected limb were also collected. Mean age was 11.0 ± 3.3 years.

**Results** We evaluated 65 children. The point prevalence of pain (pain at the time of assessment) was 25%. The reported lifetime prevalence of pain (experienced anytime during life) was 66%. A total of 71% reported that the affected extremity felt different at least once in their lifetime. Average intensity of those with pain (n = 43) was 40 ± 19 mm on a 100-mm visual analog scale. Seventy percent of children reported that symptoms occurred every day or at least once a week. Anatomical distribution of pain was throughout the affected upper extremity irrespective of the severity of injury, with the exception of children with upper plexus injuries who did not report pain in their hand. Words typically used to describe neuropathic or musculoskeletal symptoms were chosen by the children to represent their pain.

**Conclusions** Children with OBPP who had microsurgical reconstruction commonly reported pain. These symptoms were typically frequent but were episodic and low in intensity. The descriptions of the type of pain include terms typical of both neuropathic and musculoskeletal origins. *(J Hand Surg Am. 2015;40(6):1177−1183. Copyright © 2015 by the American Society for Surgery of the Hand. All rights reserved.)*

**Type of study/level of evidence** Prognostic IV.

**Key words** Brachial plexus injury, children, teenagers, outcomes, pain.

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Our understanding of pain experienced by children with obstetrical brachial plexus palsy (OBPP) is limited. Perhaps the issue of pain in these patients has not received sufficient attention because of earlier findings that infants who had microsurgical reconstruction of the brachial plexus did not have neuropathic and chronic pain despite spinal root avulsions.[1] This contrasts with the typical experience of adult patients who may have debilitating neuropathic and chronic pain after with such injuries.[2] Bruxelle et al[2] reported that 91% of

 

**TABLE 1. Demographic and Surgical Information**

| Demographics | Total (N = 65) | | Upper Plexus (n = 28) | | Total Plexus (n = 37) | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| **Sex** | | | | | | |
| Male | 26 | 40 | 15 | 54 | 11 | 30 |
| Female | 39 | 60 | 13 | 46 | 25 | 70 |
| **Affected Limb** | | | | | | |
| Left | 20 | 31 | 9 | 32 | 11 | 30 |
| Right | 45 | 69 | 19 | 68 | 25 | 70 |
| **Surgery** | | | | | | |
| Microsurgery only | 33 | 51 | 12 | 43 | 21 | 57 |
| Microsurgery and secondary upper extremity reconstruction | 32 | 49 | 16 | 57 | 16 | 43 |
| **Root avulsions*** | | | | | | |
| 0 | 23 | 35 | 17 | 61 | 6 | 16 |
| 1 | 20 | 31 | 8 | 29 | 12 | 33 |
| 2 | 14 | 22 | 2 | 7 | 12 | 33 |
| 3 | 4 | 6 | 1 | 4 | 3 | 8 |
| 4 | 2 | 3 | 0 | 0 | 2 | 5 |
| Missing data | 2 | 3 | 0 | 0 | 2 | 5 |

*Statistically significant, $P < .05$.

adults with brachial plexus injuries had pain, 41% of whom categorized the pain as severe. Furthermore, spinal root avulsion was a key factor associated with pain immediately after injury and at follow-up. Bertelli et al[3] confirmed a relationship between root avulsion and pain in adults. In addition, that study found that the prevalence of pain was greater in adults with total plexus palsy than in those with upper plexus palsy. However, a comparison of pain outcomes in children with the standards used with adults fails to recognize that children may experience pain differently. It is important that both the timing of evaluation and the assessments used be able to capture the potentially delayed presentation of pain in these children and the appropriate expressive language used by children to describe pain.

Self-mutilation is a behavior associated with pain and sensory disturbance that has been investigated in children with OBPP. Al-Qattan[4] evaluated self-mutilation behaviors in children aged 2 to 8 years with OBPP. Six of the 127 children (5%) studied exhibited this behavior. The prevalence of self-mutilation was higher in children with total plexus (4 of 37) than upper plexus palsy. None of the children who exhibited these symptoms reported pain. McCann et al[5] added to these findings with comparative outcomes of children with and without microsurgical reconstruction of the brachial plexus in infancy. The incidence of self-mutilation was 29% in 24 children who had surgery and 1% (2 of 147) in those who did not have surgical treatment. The authors suggested that self-mutilation was a manifestation of a chronic pain syndrome or dysesthesias in the children identified. These reports indicated that the nature of neuropathic pain was not fully understood and could not be ruled out in children with OBPP.

The purposes of this study were to determine the prevalence of pain in children with OBPP and describe the characteristics of this pain. Secondarily, this study aimed to compare the prevalence of pain with the severity of brachial plexus injury.

## MATERIALS AND METHODS

Our research ethics board approved this prospective case series. Inclusion criteria were children aged 6 to 18 years with a confirmed diagnosis of OBPP, who required microsurgery at less than age 12 months with nerve grafting or transfer. Children with a later traumatic brachial plexus injury, bilateral brachial plexus palsy, cognitive or developmental delay, or a recent (< 3 mo) injury to the affected or unaffected upper extremity at the time of recruitment were excluded.

We extracted the child's surgical information from the Hospital for Sick Children Brachial Plexus