

# Musculoskeletal Pain in Children and Adolescents: A Way Forward

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**D**espite recognition of the potential to improve population health across the life course, with all attendant societal and economic benefits, substantial investment in pediatric research has not been forthcoming. For example, the US National Institutes of Health biomedical research budget doubled from 1997 to 2003, during which time the spending on pediatric projects remained stagnant.<sup>7</sup> The situation with regard to research into musculoskeletal pain is even more parlous. According to data from the US Department of Health and Human Services, just 1.4% of the total National Institutes of Health funding for pediatric projects in 2013 went toward musculoskeletal research.<sup>32</sup>

This level of public funding support might be understandable if the burden of disease associated with musculoskeletal pain in children and adolescents was trivial, but this is very evidently not the case. One-month prevalence of musculoskeletal pain in adolescents is in the order of 30% to 50%,<sup>13</sup> and up to 20% of adolescents report important impacts, including missing school, requiring

medication, or interference with physical activity.<sup>27</sup> Data from the World Health Organization Global Burden of Disease project indicate that musculoskeletal conditions, particularly back and neck pain, are responsible for approximately 10% of years lived with disability globally among 15- to 19-year-olds, and 5% for 10- to 14-year-olds.<sup>11</sup> Further, young individuals with musculoskeletal pain make up a significant proportion of pediatric presentations to primary care providers<sup>3,8</sup> and contribute to huge public health care expenditure.<sup>6,25</sup>

An implication of the low level of research funding is the dearth of clinical research evidence available to help clinicians make treatment decisions for their pediatric patients with musculoskeletal

pain. This knowledge gap has been recognized repeatedly,<sup>1,4,20</sup> and is exemplified by a recent systematic review of randomized controlled trials of nonsurgical treatments for children with back pain.<sup>22</sup> The authors identified only 4 studies that met their inclusion criteria; by comparison, the same search conducted in adult populations would include greater than 2000 randomized controlled trials. The problem is further illustrated by a review of international clinical practice guidelines for low back pain,<sup>16</sup> all of which either specifically exclude people under the age of 18 or base recommendations on research conducted in adults.

It is reasonable to ask why musculoskeletal pain in children and adolescents has not received more attention from researchers. There may be challenges related to obtaining consent and assent from parents or legal guardians, as well as from children. There is also the view that Institutional Review Boards more closely scrutinize research conducted on children. Perhaps more influential,

though, is the perception that musculoskeletal pain in children and adolescents is generally trivial and unlikely to be an indicator of serious or ongoing problems. This perception can feed into the fear that increased attention may “medicalize” normal aches and pains. Whether or not this fear is justified is unknown, but it is becoming increasingly clear that for some children, especially adolescents, pain does have important consequences. Musculoskeletal pain becomes persistent in 15% to 25%<sup>12,27</sup> of adolescents, persistent pain is associated with increased rates of alcohol use and smoking,<sup>21</sup> and more frequent pain in adolescence is associated with chronic pain in adulthood.<sup>9</sup> The lack of research in the area severely hampers our ability to distinguish between the children who need professional care and those who need reassurance and encouragement to continue on their way.

All of the above describes a somewhat gloomy landscape, but the real question is what to do from here. We argue that the 3 approaches below have the potential to improve the situation.

The first involves updating the narrative around musculoskeletal pain, especially in adolescents. Popular media, and even health profession communications, focus attention on the damaging role of biomechanical factors such as backpacks, electronic device use, posture, and sports participation. This is in spite of evidence showing that socioeconomic, psychological, and lifestyle behaviors are more likely the relevant risk factors.<sup>10</sup> A change to consider pediatric musculoskeletal pain, particularly when chronic or recurrent, as a biopsychosocial problem is probably overdue. A number of articles in this special issue explore this theme; the clinical commentary by O’Sullivan et al<sup>26</sup> speaks to the way in which musculoskeletal pain is conceptualized, and the study by Smith et al<sup>31</sup> provides evidence that a range of factors from multiple domains are related to adolescent pain. Interestingly, 3 papers from van Meulenbroek et al,<sup>33</sup> Schmidt et al,<sup>30</sup> and Nicholson et al<sup>24</sup> all indicate that joint hypermobility may not

be of particular importance, but highlight the significance of psychosocial factors in understanding pain in adolescents. The clinical commentary by Collins et al<sup>2</sup> describes an example of how a multidisciplinary approach to treatment of young people with pain can work in practice.

Several studies show concurrence of chronic musculoskeletal pain with “big-ticket” public health issues in adolescents, factors such as overweight and obesity, smoking, alcohol consumption, and poor mental health.<sup>5,17,28,29</sup> These factors are established indicators of poor health and adverse health risk, and are the targets of public health interventions currently delivered to school students. Given the nature of some of these interventions, which include attempts to increase physical activity and discourage substance use, it is possible that pain may be a barrier to their uptake and effectiveness. Studies by McLaren et al<sup>21</sup> and Leininger et al<sup>18</sup> in this special issue investigate this theme by examining how pain relates to health risk behaviors and to physical activity. Bringing musculoskeletal pain into the conversation concerning the overall health of adolescents may help establish a profile more in keeping with the burden.

Finally, increasing the volume and quality of research conducted in the field will help create a critical mass of researcher capacity and practice-relevant clinical evidence. Interpretable and useful evidence requires the use of valid and comparable outcome measures relevant to the population, such as those described in the articles by Luca et al<sup>19</sup> and Michaleff et al<sup>23</sup> in this issue. Given that childhood is a period of growth and change, understanding the nature of musculoskeletal pain from a life-course perspective is also key; studies from Kamper et al<sup>14</sup> and van Middelkoop et al<sup>34</sup> speak to this theme. An advantage of coming a little late to the party is that the field of pediatric musculoskeletal pain research can learn from the shortcomings evident in the adult literature. The field can benefit from attention to principles central to production of

high-quality, clinically relevant evidence such as prioritization of important questions, robust study methodology, multidisciplinary collaboration, and attention to translation.

There are substantial gaps in our understanding of musculoskeletal pain in children and adolescents.<sup>15</sup> While there are challenges to performing research in this space, the prevalence, burden, and lack of available evidence to inform clinical practice mean that overcoming these challenges is important. The editors see the collection of work in this special issue as a step in the right direction. ●

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