

Insights from Research on the Use of Stress Balls in Children and Adolescents

Squeezing a stress ball is a simple and low-cost way to reduce stress and negative emotions through tactile distraction. This idea is consistent with the gate control theory of pain (Melzack & Wall, 1965), which proposes that non-painful sensory stimulation can suppress the transmission of pain signals, thereby reducing perceived pain. Such sensory modulation may also contribute to reduced discomfort and emotional distress. Children and adolescents who are often more responsive to tactile or sensory interventions may benefit from stress balls as a constructive form of distraction.

Despite their widespread availability and simplicity, stress balls have not been systematically reviewed as a standalone intervention in children and adolescents. This gap in the literature may arise from perceptions of stress balls being overly simplistic or their inclusion as part of broader distraction-based interventions rather than being studied independently. The primary aim of this systematic review is to summarise the contexts in which stress balls have been used, the outcomes assessed, the methods of assessment and the comparator conditions employed. By highlighting these aspects, this review aims to guide future research and identifies key gaps to be addressed.

This review followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). On 29 January 2026, a comprehensive search strategy was implemented, including singular and plural forms of “stress ball” as well as multiple synonyms for the target population. The databases searched were Web of Science, Scopus, PubMed and APA PsycInfo, supplemented by screening the first 100 relevant results from Google Scholar. Retrieved records were processed through the standard identification, screening, eligibility and inclusion stages, yielding 18 studies that met the inclusion criteria.

Of these 18 included articles, only one conducted by Stalvey and Brasell (2006) was situated in an educational setting. This study was published nearly two decades ago and no additional education-based studies were identified. The remaining studies were conducted in medical or dental contexts such as hospitals and dental clinics and were published more recently from 2021 onwards. This distribution underscores a contemporary research focus on stress ball use in clinical populations of children and adolescents.

Intervention design differed substantially between educational and clinical studies. In the 17 medical and dental studies, stress balls were typically used as brief, single-session interventions during specific procedures such as the administration of local anaesthesia or swabbing. In contrast, the educational study by Stalvey and Brasell (2006) implemented a multi-week intervention in which learners used stress balls several times per week for 30

minutes per session. These differences are contextually understandable. Clinical procedures are usually one-off events for individual children, limiting opportunities for repeated use of stress balls. In contrast, classroom settings involve ongoing interaction with the same students, allowing for sustained interventions.

The outcomes assessed varied by context. Clinical studies primarily focused on emotional or physiological responses to anxiety-inducing or painful procedures. Anxiety was measured using diverse assessment tools while fear was consistently evaluated using the Children's Fear Scale (McMurtry et al., 2011). Pain-related outcomes were most frequently measured using the Wong-Baker Faces pain rating scale (Wong-Baker FACES Foundation, 2016; Wong & Baker, 1988). Physiological outcomes such as heart rate and oxygen saturation were monitored using pulse oximeters in several studies. By contrast, the educational study focused on outcomes such as attitudes, off-task distractions, attention and writing performance. These distinctions highlight the adaptability of stress balls as an intervention and the importance of aligning outcome measures with the context of use.

In terms of comparators, interventions were frequently compared with other distraction techniques or no intervention. Comparisons ranged from simple techniques such as pinwheel blowing or breathing exercises to more immersive multisensory interventions including virtual reality or hands–eyes–mouth distraction approaches.

The findings of this review point to several important directions for future research. The absence of recent educational research indicates a clear gap, particularly regarding potential effects on academic performance, attention and classroom behaviour. The predominance of single-use interventions in medical and dental contexts leaves the potential cumulative benefits of repeated stress ball use unexplored. Longitudinal studies examining repeated use over weeks or months could clarify whether sustained exposure enhances emotional regulation and behavioural outcomes. Additionally, research is needed to determine optimal intervention parameters including the frequency, duration and longitudinal application of stress ball use. While anxiety and fear have been commonly assessed, other emotional responses such as anger, sadness or frustration remain largely unexamined. Finally, future research could explore stress ball interventions in home or community settings, broadening understanding beyond clinical and educational contexts.

Overall, this review provides insights for researchers interested in children's and adolescents' mental health and the application of sensory-based interventions. Addressing the identified research gaps could help develop strategies to more effectively support the emotional well-being and physiological outcomes of young populations.

Keywords: stress balls, children, adolescents, systematic review

References

- McMurtry, C. M., Noel, M., Chambers, C. T., & McGrath, P. J. (2011). Children's fear during procedural pain: Preliminary investigation of the Children's fear scale. *Health Psychology, 30*(6), 780–788. <https://doi.org/10.1037/a0024817>
- Melzack, R., & Wall, P. D. (1965). Pain Mechanisms: A new theory: A gate control system modulates sensory input from the skin before it evokes pain perception and response. *Science, 150*(3699), 971-979.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Bmj, 372*. <https://doi.org/10.1136/bmj.n71>
- Stalvey, S., & Brasell, H. (2006). Using stress balls to focus the attention of sixth-grade learners. *Journal of At-Risk Issues, 12*(2), 7-16.
- Wong-Baker FACES Foundation (2016). *Wong-Baker FACES® Pain Rating Scale*. <http://www.wongbakerfaces.org>
- Wong, D. L., & Baker, C. M. (1988). Pain in children: Comparison of assessment scales. *Pediatric Nursing, 14*(1), 9–17.