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Beyond Needles and Syringes: A Review of Innovations in Local Anaesthesia Administration in Dentistry

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Efficient pain and discomfort management in oral health is crucial, as they can act as barriers to effective dental care delivery (Al-Omari & Al-Omiri, 2009). Oral health practitioners who poorly manage pain and discomfort can potentially initiate fear and a negative attitude towards dental treatment. Local anaesthesia is vital in pain and discomfort control during dental procedures. Traditionally, it is administered using a needle and syringe, a method that causes pain upon injection (Yesilyurt et al., 2008). In response, innovative technologies have been introduced to reduce pain and discomfort during local anaesthesia administration. Numerous techniques have been examined to minimise injection pain, including slowing the injection rate, pre-warming the solution, and using narrow or sharp needles. However, despite these advancements, achieving a completely painless injection remains a significant challenge (Yesilyurt et al., 2008). The increasing recognition of this challenge has prompted research into alternative methods and supplementary aids, including devices that make administering dental local anaesthesia less painful. While previous studies have reported the effectiveness of specific technologies, such as computer-controlled local anaesthesia devices, compared to conventional needles and syringes, investigations of other emerging devices and technologies designed to reduce discomfort during dental anaesthesia administration are lacking. Therefore, a scoping review will be performed, adhering to the guidelines of the Joanna Briggs Institute (JBI) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) (Aromataris & Munn, 2020). This scoping review will systematically map the existing body of knowledge related to various local anaesthesia techniques and their associated devices developed to minimise pain during dental procedures. Moreover, as detailed in the existing literature, it will capture their defining characteristics and role in reducing pain during dental procedures. It will identify common themes and gaps in current knowledge to guide future research priorities.

Keywords
Local anaesthetic delivery devices; painless; discomfort; computer-controlled anaesthesia

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