Cuddle and Comfort Chimp: An Innovative Soft Robotic Sleep Aid

Wilson, Timothy (School: Barker College)

Poor sleep is a major contributor to adolescent health issues, linked to poor mental health, risk-taking behaviour, and even physical health problems. Sleep issues can harm family and social relationships, while also hindering academic performance. Despite the pressing need for effective solutions, existing technological options fail to address the underlying contributors to difficulty falling asleep, such as stress and anxiety in adolescents. To address this limitation, the project introduces the ‘Cuddle and Comfort Chimp’, a prototype soft robotic sleep aid that aims to facilitate a faster sleep onset by helping reduce stress and create a sense of comfort. Developed through a systematic and iterative design process, the device has two unique central functions: soft robotic arms that gently hug the user - providing tactile reassurance, and a biomimetic breathing motion. The chimp features a CO2 sensor and peak detection algorithm to measure and sync its breathing motion with the user's breathing. In addition, a force sensor initiates reciprocal hugging, and a discrete control panel allows the user to change functions. Made with compliant pneumatic systems and soft materials, it is quiet, ergonomic and comforting. Preliminary tests with adolescents suggest a faster sleep onset when using the prototype sleep aid, with additional qualitative results indicating it offers a sense of reassurance. The Cuddle and Comfort Chimp – an innovative sleep assistant prototype, implements physiological and emotional intervention strategies in a soft robotic design.

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