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<http://www.pediatricurologycasereports.com>**Novel therapeutic approaches for non-neurogenic overactive bladder in pediatric patients****Winston Ronin\****Department of Urology, Suranaree University of Technology, Nakhon, Thailand*✉ **Winston Ronin\****Department of Urology,  
Suranaree University of Technology,  
Nakhon, Thailand  
E-mail: Winsr336@gmail.com*

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**Description**

Non-Neurogenic Overactive Bladder (NNOAB) in pediatric patients is a common condition characterized by urinary urgency, frequency, and incontinence. While traditional treatments such as behavioral therapy and pharmacotherapy remain foundational, novel therapeutic approaches are emerging to address the challenges of managing NNOAB in children. Traditional pharmacological treatments for NNOAB in children primarily include anticholinergic medications such as oxybutynin, tolterodine, and solifenacin. However, these medications are associated with side effects such as dry mouth, constipation, and cognitive impairment. Novel pharmacological approaches aim to provide effective symptom relief with improved tolerability.

Mirabegron, a  $\beta_3$ -adrenergic agonist, has shown promising results in adult populations and is being investigated for use in pediatric patients with NNOAB. Mirabegron acts on the detrusor muscle to increase bladder capacity and reduce urgency without affecting cognitive function. Botulinum toxin injections into the detrusor muscle have been explored as a treatment option

for refractory NNOAB in pediatric patients. Botulinum toxin inhibits acetylcholine release from presynaptic nerve terminals, leading to muscle relaxation and decreased bladder contractions. While effective, this approach requires expertise in injection techniques and carries the risk of urinary retention. Next-generation antimuscarinic agents with improved selectivity for muscarinic receptor subtypes are under investigation for the treatment of NNOAB in children. These agents aim to provide symptom relief with reduced side effects compared to traditional anticholinergics.

Neuromodulation techniques target the neural pathways involved in bladder control to modulate bladder function and reduce overactivity. While neuromodulation has primarily been used in adult populations, its application in pediatric patients with NNOAB is gaining attention. Examples include:

Transcutaneous Electrical Nerve Stimulation (TENS) involves the application of electrical stimulation to specific nerves or muscles via surface electrodes. TENS has been investigated as a non-invasive neuromodulation technique for NNOAB in children, with studies reporting improvements in urinary symptoms and quality of life. Percutaneous Tibial Nerve Stimulation (PTNS) involves the percutaneous insertion of a needle electrode near the tibial nerve in the ankle, followed by electrical stimulation to modulate sacral nerve activity. PTNS has been shown to be effective in reducing urinary urgency and frequency in pediatric patients with NNOAB, with minimal adverse effects. Sacral Neuromodulation (SNM) involves the implantation of a neuromodulation device, typically a sacral nerve stimulator, to modulate bladder function. While SNM has been used primarily

in adults, studies have demonstrated its efficacy and safety in pediatric patients with refractory NNOAB.

In addition to pharmacological and neuromodulation approaches, behavioral and alternative therapies play a valuable role in the management of NNOAB in pediatric patients. Pelvic Floor Muscle Training (PFMT) involves exercises to strengthen the pelvic floor muscles and improve bladder control. PFMT has been shown to be effective in reducing urinary symptoms and improving continence in children with NNOAB, particularly when combined with biofeedback techniques. Traditional Chinese medicine modalities such as acupuncture and herbal medicine have been explored as alternative treatments for NNOAB in children. While evidence is limited, some studies suggest potential benefits in reducing urinary urgency and frequency. Bladder training techniques, including scheduled voiding and delayed voiding, aim to retrain bladder function and improve voiding habits. Biofeedback therapy provides visual or auditory feedback to enhance awareness of bladder sensations and control. Novel therapeutic

approaches for non-neurogenic overactive bladder in pediatric patients provide improved symptom relief with reduced side effects compared to traditional treatments. These advancements include targeted pharmacological agents, innovative neuromodulation techniques, and alternative therapies, providing tailored and effective management options for pediatric NNOAB.

### ***Conclusion***

In conclusion, novel therapeutic approaches for non-neurogenic overactive bladder in pediatric patients offer promising options for symptom management and improved quality of life. From innovative pharmacological agents to neuromodulation techniques and alternative therapies, the evolving landscape of NNOAB treatment provides opportunities for individualized care and optimized outcomes. Continued research and clinical trials are needed to further evaluate the safety, efficacy, and long-term benefits of these novel interventions in pediatric patients with NNOAB.