

## Antipyretic Medication Treatment for Pediatric Fever

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## DESCRIPTION

In the absence of an underlying condition that reduces tolerance to fever, fever in children is normally a benign process that does not require treatment. Fever, on the other hand, can raise parental anxiety if it causes discomfort and distress. Acetaminophen (paracetamol) and ibuprofen are Over-The-Counter OTC antipyretics that are often used to relieve fever and related discomfort in this situation.

Ibuprofen affects a range of inflammatory processes and cellular systems by inhibiting Cyclooxygenase (COX) isoenzymes in a nonselective and reversible manner. COX-1 is a constitutive enzyme that catalyses the formation of prostanoids and thromboxane A2 from arachidonic acid, chemicals that regulate vascular, gastric, and renal function. COX-2 is an inducible isoenzyme whose activity is elevated in painful and inflammatory circumstances, resulting in increased production of prostaglandin E2, the main mediator of human fever. The mechanism of action of acetaminophen, on the other hand, is still uncertain, despite preclinical indications of COX inhibition centrally and other evidence indicating acetaminophen's antinociceptive effects require activation of descending spinal serotonergic pathways.

The American Academy of Pediatrics' clinical report on antipyretic usage in children describes the antipyretic effects of acetaminophen and ibuprofen individually and gives pediatric dose recommendations. At physician-directed doses (acetaminophen, 15 mg/kg every 4 hours; ibuprofen, 10 mg/kg every 6 hours), both medications are more effective than placebo in decreasing fever, and there is no indication of a substantial difference in safety at these doses. Furthermore, both drugs are available over-the-counter in doses of 10-15 mg/kg for acetaminophen and 5-10 mg/kg for ibuprofen.

In a variety of acute and chronic pain and inflammatory disorders, ibuprofen has a positive overall safety profile. However, depending on the dose, simultaneous use of other drugs, comorbidities, and patient group, ibuprofen has been linked to renal and hepatic side effects. Gastrointestinal problems were the most common ibuprofen-related side effects in youngsters (nausea, vomiting, abdominal pain, diarrhea, constipation, dyspepsia, and flatulence). Peptic ulcers, gastric haemorrhage, and gastric perforation were all rare (0.01%) but potentially life-threatening gastrointestinal side effects. Ibuprofen-related renal side effects are uncommon (0.01%), but can include acute kidney failure, interstitial nephritis, and papillary necrosis with long-term use. When taken within the prescribed therapeutic dose range, acetaminophen has a proven track record of safety. However, exceeding the maximum daily dose of acetaminophen is a well-documented major cause of hepatotoxicity and abrupt liver failure.

While acetaminophen and ibuprofen are both effective antipyretics, they've also been used in combination or alternating regimens, with some writers claiming that the combination is more efficacious than each agent alone. Pediatricians have embraced the use of acetaminophen and ibuprofen together, and caregivers frequently provide the two drugs together. When both are taken as advised, their combination use can be well tolerated. Unfortunately, with these more sophisticated regimens, there are worries about possible dosing errors that lead to inadvertent overdose. Despite the fact that the reported dose taken was below the 24-hour total daily allowance in 28% of the cases, liver failure occurred in 127/199 (64%) of the cases, and 49 (39%) of these died, according to a recent systematic literature review and meta-analysis of 199 cases of repeated supratherapeutic acetaminophen ingestion. Ibuprofen overdose, on the other hand, is associated with few notable clinical consequences; however severe adverse effects have been described, including rare cases of death.

Although the overall antipyretic efficacy of acetaminophen and ibuprofen OTC oral tablet and syrup formulations in febrile children at physician-directed doses is similar, ibuprofen may have modest advantages over acetaminophen at OTC doses in terms of faster onset of antipyresis, duration of fever reduction and overall efficacy, but provides only limited clinical benefit. When caregivers follow the dosing instructions on the label, both acetaminophen and ibuprofen are well tolerated and effective. Given their different modes of action, metabolism, and end-organ toxicities, combining or alternating acetaminophen and ibuprofen appears to provide some antipyretic effectiveness advantages in children compared to either agent alone, and

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looks to be well tolerated. Given that patient comfort or discomfort are probably more important outcomes than antipyresis, a systematic study of these patient-centered outcomes throughout treatment with acetaminophen or ibuprofen should aid in choosing the optimal course of action in the management of pediatric fever.