





**Table 1.** Immediate-release stimulants used for ADHD

Generic Name	Brand Name	Usual Daily Dose
<b>Amphetamine</b>		
Racemic (dextro-levo)	Benzedrine® (withdrawn)	10 - 40(0.3 - 1)
Dextroamphetamine	Dexedrine®	10 - 40(0.3 - 1)
Levoamphetamine	Dextrostat®	5 - 30(0.2 - 0.7)
Mixture 3/4 d-, 1/4 l-amphetamine	Cydril® (withdrawn)	14 - 42(0.3 - 1)
Methamphetamine	Adderall®	10 - 40(0.3 - 1)
	Desoxyn®	5 - 25(0.2 - 0.7)
<b>Methylphenidate</b>		
Racemic threo-methylphenidate	Ritalin®	10 - 60(0.3 - 1.5)
	Methylin™	
Dextro-threo-methylphenidate	Focalin™	5 - 30(0.2 - 0.7)
<b>Pemoline</b>	Cylert®	37.5 - 112.5(1 - 3)

**Table 2.** Pharmacokinetics of drugs for the Treatment of Attention-deficit/hyperactivity disorder

Drug and preparation	Plasma half-life (hour)	Peak plasma concentration (hour)	Duration of effects on behavior (hour)
Methylphenidate, immediate-release form	3.3	1.6	1 - 4
Dextroamphetamine sulfate, immediate-release form	6.6	3 - 4	1 - 8
Pemoline	5 - 6	2 - 3	7 - 9

racemic amphetamine psychostimulant dopamine  
 . Levoamphetamine dopamine noradrenaline axon terminal  
 Norepinephrine transporter dopamine  
 . noradrenaline axon terminal  
 가 . nal synaptic vesicle transporter  
 levoamphetamine . Am- dopamine noradrena-  
 phetamine racemic line vesicle vesicle  
 amphetamine dextroamphetamine, 1/4 le- exocytosis가 ,  
 voamphetamine 3/4 dextroamphetamine .  
 가 ADHD . Methyl- Psychostimulant  
 phenidate 가 2 가 , (Table  
 2)¹²). P - hydroxylation, N - methylation, deamination,  
 erythro . erythro amphetamine 80%가  
 threo , methylphenidate  
 threo d l racemic threo de - esterification .  
 methylphenidate가 . dextro  
 dextro dextro - threo - methylphenidate  
 (Table 1). . Psychostimulant

가 psychostimulant

13) .

Methylphenidate ,

가 가

14) . psychostimulant가

가

가 20~65% 19)

psychostimulant James Swanson

, U.S. Drug

Enforcement Administration psychostimulant

2. 장기 작용형 Psychostimulants (Table 3)

Psychostimulant

10

methylphenidate

가가

1993 methylphenidate

3 1990 2.5 가 가

15) psychostimulant가

가 가, 가

DSM - 2)

10%가

16)17),

가<sup>1)</sup>,

가<sup>18)</sup>,

3),

가

(wax - matrix vehicle). Ri-

talin - SR<sup>®</sup> (MHH - SR20) , 가 Me-

thylphenidate - SR, Metadate<sup>®</sup>, Methylin - SR<sup>®</sup>

psychostimulant

Dexedrine Spanule<sup>®</sup>

**Table 3.** Sustained/extended-release options for common stimulants

Stimulants	Preparations	Type/Form	Duration
Methylphenidate	Metadate™ CD	Encapsulated beads with different dissolution times	8 - 9hour
	Methylin™ ER	Tablets	Variable
	Retalin SR <sup>®</sup>	Coated tablets	Variable
d-Amphetamine	Dexedrine <sup>®</sup> Spanule	Encapsulated beads with different dissolution times	10 - 12hour
3/4 d-Amphetamine, 1/4 l-Amphetamine	Adderall <sup>®</sup> XR	Encapsulated beads with different dissolution times	10 - 12hour

Adderall XR, Metadate CD™ (pharmacokinetics)  
 가 James Swanson (pharmacodynamics)  
 21)22),  
 가 (UC)  
 psychostimulant 10% 가 Irvine) ADHD  
 2~3 가 가  
 20) 가  
 가  
 30 MPH - SR20 ADHD 가 2  
 90 가 2  
 methylphenidate 8 가 가 가  
 가 "ramp effect" 가 가 가  
 SKAMP ADHD 가  
 가  
 2 MPH - SR20 40% 가  
 3 12 Psychostimulant (tolerance)  
 가 psychostimulant가  
 (acute tolerance)  
 Swanson  
 가

3. Psychostimulant의 약물동력학(Fig. 2)

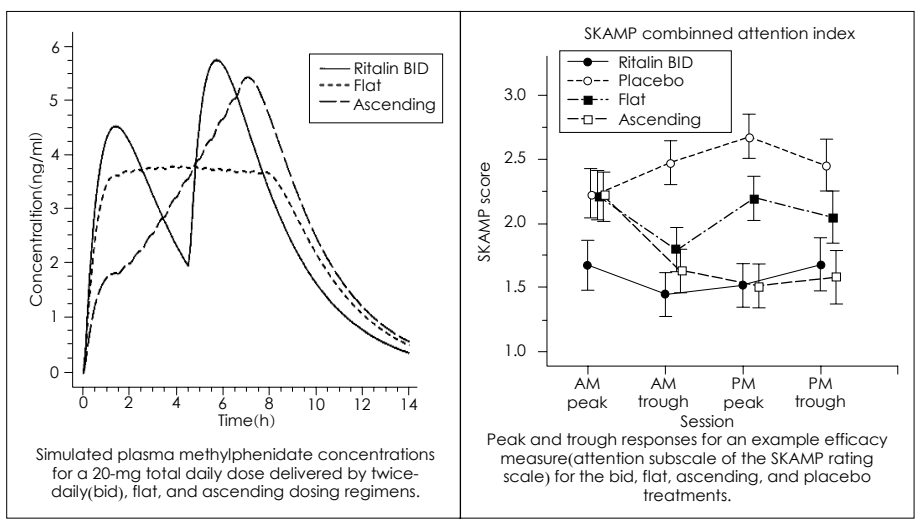


Fig. 2. Pharmacokinetic-pharmacodynamic relationship of methylphenidate in ADHD children.

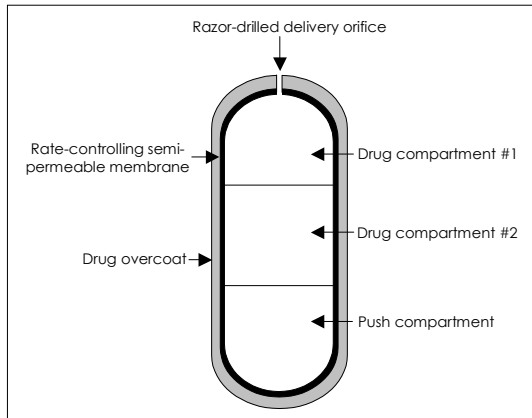


Fig. 3. Structure of OROS methylphenidate(Concerta®).

methylphenidate  
 가  
 psychostimulant  
 4. 새로운 약물전달체계를 응용한 장기 작용형 Psychostimulant  
 Swanson stimulant가 OROS - methylphenidate(Concerta®) (semipermeable membrane) 가 methylphenidate 가  
 3  
 methylphenidate  
 가 methylphenidate가 methylphenidate가  
 methylphenidate 20%  
 가 (Fig. 3). 12 ADHD 1  
 multimodal treatment study 8)

3 methylphenidate 23-25)  
 결론  
 가  
 가  
 가 , 6  
 가  
 가  
 가  
 ADHD  
 가,  
 가,  
 psychostimulant  
 psychostimulant  
 , ,  
 psychostimulant가  
 Psychostimulant 60  
 methylphenide

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## **NEW DRUG THERAPY IN CHILD AND ADOLESCENT PSYCHIATRY-NEW LONG-ACTING PSYCHOSTIMULANTS**

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Attention-deficit/Hyperactivity disorder (ADHD) is the most common psychiatric disorder of childhood and among the most prevalent chronic health conditions affecting school-aged children. Children with ADHD experience significant functional problems, such as school difficulties, academic underachievement, troublesome interpersonal relationships with family members and peers, and low self-esteem. The most widely used pharmacological treatments for ADHD are psychostimulants, such as methylphenidate and amphetamine salts. These medications provide clinical efficacy by increasing the availability of catecholamines, primarily dopamine, in the frontal lobe of the brain. Immediate-release (IR) formulations of psychostimulants were among the most effective psychotropic medications in the psychopharmacological treatment. However, there are some limitations of IR formulations : the short half-life and duration of efficacy, which result in the need for multiple daily dosing and the poor compliance. These limitations have led to the development of once-daily, extended-release (ER) formulations of methylphenidate and amphetamine salts. However, these ER formulations may not be as immediately helpful to ADHD children due to delayed onset of action and the acute tolerance which is the failure to sustain the efficacy with the same concentration of drug as the initial stage of medication. OROS-methylphenidate (Concerta<sup>®</sup>) given once a day produces an ascending-pattern plasma drug level generated by the osmotically released, timed drug-delivery system. These new formulations of the psychostimulants have been shown to be a useful alternative to old stimulant medications through the evidence by the clinical trials.

**KEY WORDS** : ADHD · Psychostimulant · Concerta.