methylphenidate (oral) (meth-ill-fen-ide)  
- Biphentin, Concerta, Metadate ER, Methylin ER, 
- Methylin SR, Ritalin, Ritalin LA, Ritalin ER

methylphenidate (transdermal)  

Definition  
Theophylline: central nervous system stimulants

Schedule II  

Pregnancy Category C

Indications  

Action  
Produces CNS and respiratory stimulation with weak sympathomimetic activity. Therapeutic Effects: Increased attention span in ADHD. Increased motor activity, mental alertness, and diminished fatigue in narcoleptic patients.

Pharmacokinetics  
Absorption: Slow and incomplete after oral administration; absorption of sustained or extended-release tablet (SR) is delayed and provides continuous release; well absorbed from skin. Metadate CD, Concerta, Ritalin LA—provides initial rapid release followed by a second continuous release (biphasic release).

Distribution: Unknown.

Metabolism and Excretion: Mostly metabolized (80%) by the liver.

Half-life: 2–4 hr.

TIME/ACTION PROFILE (CNS stimulation)  

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>unknown</td>
<td>1–3 hr</td>
<td>4–6 hr</td>
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<tr>
<td>PO-ER</td>
<td>unknown</td>
<td>4–7 hr</td>
<td>3–12 hr†</td>
</tr>
<tr>
<td>Transdermal</td>
<td>unknown</td>
<td>unknown</td>
<td>12 hr</td>
</tr>
</tbody>
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†Depends on formulation

Contraindications/Precautions  
Contraindicated in: Hypersensitivity; Hyperexcitable states; Hyperthyroidism; Patients with psychotic personalities or suicidal or homicidal tendencies; Personal or family history of Tourette's syndrome; Glaucoma; Motor tics; Concurrent use or use within 14 days of MAO inhibitors; Progressive or established, or neuro-developmental insufficiency; Surgery.

Use Cautiously in: History of cardiovascular disease (sudden death has occurred in children with structural cardiac abnormalities or other serious heart problems); Hypertension; Diabetes mellitus; History of contact sensitization with transdermal product (may be at increased risk for systemic sensitization reactions with oral products); Gentamicin or temocillin patients, Discontinue use (may result in psychological or physical dependence); Tourette's disorder (may occur after the first few days of product exposure). Concerta product should be used cautiously in patients with esophageal motility disorders or severe GI narrowing (may increase the risk of obstruction). OP=Ophthalmic: Safety not established. Potentially suppresses growth in children with long-term use, children <6 yr (transdermal only).

Adverse Reactions/Side Effects  
CNS: Hyperactivity, insomnia, restlessness, tremor, behavioral disturbances, irritability, mania, thought disorder.

EENT: Blurred vision, teeth grinding.

CV: Sudden death, hypertensive crisis, palpitations, tachycardia, hypotension, peripheral vasculopathy.

GI: Anorexia, constipation, cramps, diarrhea, dry mouth, metallic taste, nausea, vomiting, dryness, contact sensitization (erythema, edema, papules, vesicles) (transdermal), erythema, rash.

Metab: Growth suppression, weight loss (may occur with prolonged use).

Neuro: akathisia, dyskinesia, tics.

Misc: Anaphylaxis, angioedema, fever, physical dependence, psychological dependence, tolerance.

Interactions  
Drug-Drug: Synergistic effects with other sympathomimetics, including vasoconstrictors, decongestants, and halogenated anesthetics. Use with MAO inhibitors or vasopressors may result in hypertensive crisis (concurrent use or use within 14 days of MAO inhibitors is contraindicated) Warfarin, phenytoin, phenobarbital, primidone, phenylbutazone, selective serotonin reuptake inhibitors, and tricyclic antidepressants may [ and effects)]. Avoid concurrent use with pimozide (may mask cause of tics). May [the effectiveness of
Methylphenidate

Drug-Natural Products: Use with caffeine-containing herbs (guarana, tea, coffee) may cause CNS stimulation.

Route/Dosage

PO (Children 6–17 yr): 10 mg 2–3 times/day; maximum dose 60 mg/day.

PO (Adults): Formulations (Metadate CD, Ritalin LA).

 adherence.

PO (Children 6–17 yr): Prompt release tablets—0.3 mg/kg/dose or 2.5–5 mg before breakfast and lunch; 7 to 10 mg/kg/day or 5–10 mg/m² or weekly intervals (not to exceed 60 mg/day or 2 mg/kg/day). When maintenance dose is determined, may change to extended-release formulation. Ritalin SR. Methylphenidate ER—may be used in place of the prompt-release tablets when the 8-hour dosage corresponds to the intended 6-hour dosage of the prompt-release tablets, (Quillivant XR—metabolite). Methylphenidate (flare-up of previous dermatitis or prior positive patch-test sites, generalized skin eruptions, headache, fever, malaise, arthralgia, diarrhea, vomiting). If contact sensitization develops and oral methylphenidate is instituted, monitor closely for behavior change. Therapy may be interrupted at intervals to determine whether symptoms are sufficient to continue therapy.

NURSING IMPLICATIONS

Assessment

● Monitor BP, pulse, and respiration before administering and periodically during therapy. Obtain a history (including assessment of family history of sudden death or ventricular arrhythmia), physical exam to assess for cardiac disease, and further evaluation (ESG and echocardiogram), if indicated. If exertional chest pain, unexplained syncope, or other cardiac symptoms occur, evaluate promptly.

● Monitor closely for behavior change.

● Monitor for signs and symptoms of peripheral vasculopathy (numbness and burning fingers, digital changes). May require reduction or discontinuation.

● Prada: Monitor growth, height and weight, in children on long-term therapy.

● May produce a false sense of euphoria and well-being. Provide frequent iron coupons and observe patient for rebound depression after the effects of the medication have worn off.

● Methylphenidate has a high abuse potential, may lead to tolerance and psychological dependence.

● ADHD: Assess children for attention span, impulsivity, and interactions with others. Therapy may be interrupted at intervals to determine whether symptoms are sufficient to continue therapy.

● Narcolepsy: Observe and document frequency of episodes.

● Transdermal: Assess skin for signs of contact sensitization (urticaria with edema, papules, vesicles) may occur within 48 hr or spreads beyond patch site during therapy. May lead to systemic sensitization to other forms of methylphenidate (flare-up of previous dermatitis or prior positive patch-test sites, generalized skin eruptions, headache, fever, malaise, arthralgia, diarrhea, vomiting). If contact sensitization develops and oral methylphenidate is instituted, monitor closely.

● Lab Test Considerations: Monitor LFT, differential, and platelet count periodically in patients receiving prolonged therapy.

Potential Nursing Diagnoses

Disturbed thought processes (Side Effects)

Implementation

● Do not confuse Metadate ER/CD (methylphenidate), or methylphenidate formulations (Metadate CD, Ritalin LA). Methylphenidate has a high abuse potential; may lead to tolerance and psychological dependence. Therapy may be interrupted at intervals to determine whether symptoms are sufficient to continue therapy.

● Do not confuse Metadate ER/CD with Metadate ER. Do not confuse Metadate CD with Metadate ER.
methylphenidate (transdermal)

- PO: Administer immediate- and sustained-release tablets on an empty stomach (30–45 min before a meal). Sustained-release tablets should be swallowed whole, do not break, crush, or chew. Median 20 and Ritalin LA capsules may be opened and sprinkled on cool applesauce; entire mixture should be ingested immedi-
ately and followed by a drink of water. Do not store for future use. Concerta may be administered without regard to food, but must be taken with water, milk, or juice.
- Shake extended-release oral suspension for 10 seconds before administering.
- May be given as a single dose or in divided doses.
- To remove patch, peel off slowly. An oil-based product (petroleum jelly, olive oil, or cocoa butter) may be used. Press firmly in place with palm of hand for 30 seconds to make sure of good contact with skin, especially around edges. Alternate site daily. Apply patch 2 hr before desired effect and remove 9 hr after applied; effects last several more hours. Do not apply or reapply to same area.
- If difficulty in separating patch from release liner, tearing, or other damage occurs during removal from liner, discard patch and apply a new patch. Inspect release liner to ensure no adhesive containing medication has transferred to liner; if transfer has occurred, discard patch. Avoid touching adhesive during application; wash hands immediately and followed by a drink of water. Do not store for future use. Concerta

PO: methylphenidate (transdermal) May be given with or without food. May be administered without regard to food, but must be taken with water, milk, or juice.

Patient/Family Teaching
- Instruct patient to take medication as directed. If an oral dose is missed, take the remaining doses for that day at regularly spaced intervals, do not double doses. Take the last dose before 6 PM to minimize the risk of insomnia. Instruct patient not to alter dose without consulting health care professional. Abrupt cessation of high doses may cause extreme fatigue and mental depression. Instruct patient to avoid driving or activities requiring alertness until response to medication is known.
- Instruct patient and/or parents that shell of Concerta tablet may appear in the stool. This is no cause for concern.
- Advise patient to avoid using caffeine-containing beverages concurrently with this therapy.
- Advise patient to notify health care professional if nervousness, insomnia, palpita-
- Advise patient and/or parents to notify health care professional of behavioral changes.
- Advise patient to notify health care professional if allergic reaction occurs, as rash, hives, or other skin reactions may be serious. Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to consult with health care professional

Advise patient to check weight 3–5 times weekly and report weight loss to health care professional.
- Max. cause dizziness or blurred vision. Caution patient to avoid driving or activities requiring alertness until response to medication is known.

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- Advise patient to notify health care professional if nervousness, insomnia, palpitations, vomiting, skin rash, or fever occurs.
- Advise patient and/or parents to notify health care professional of behavioral changes.
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Home Care Issues: Pedi: Advise parents to notify school nurse of medication regimen.

Evaluation/Desired Outcomes
- Improved attention span and social interactions in ADHD.
- Decreased frequency of narcoleptic symptoms.

Why was this drug prescribed for your patient?