Use blood glucose (BG) reading before and after exercise to determine changes in food intake and insulin dose for the next time the activity is done. It is essential that patients have had previous education on insulin action/kinetics to ensure they are able to properly adjust their insulin dose.

There is a BG lowering effect with prolonged activity and hypoglycemia can be a risk for up to 24 hours post exercise. This is a result of increased insulin sensitivity of skeletal muscle from increased energy expenditure. The next meal bolus or basal insulin dose may be reduced if this appears to be a pattern in the patient.

The most effective treatment will be to lower the dose of rapid insulin at the meal period before exercise.
Effective Treatment for MDI and Pump Patients

Most Effective Treatment for MDI Patients

For patients on a multiple daily insulin injection (MDI) regimen when exercise is done, lower the dose of rapid insulin at the meal prior to the exercise. For example, if exercise is done after breakfast lower the dose of rapid insulin at breakfast. For moderate activity lower the insulin dose by 20-50% and for strenuous activity lower the dose by 50%. Patients should only reduce insulin dose at the meal period before exercise if the exercise will take place within the first 2-3 hours after the meal due to the action profile of rapid insulin.

Most Effective Treatment for Pump Patients

For patients using an insulin pump, use the same guidelines for bolus (meal time) insulin reductions. For exercise at other times patients should use a temporary basal rate reduction to help prevent hypoglycemia.

During contact sports of endurance training the pump may be removed if desired and it is considered safe to remove for up the 90 minutes. If the pump is off for more than 90 minutes a portion of the missed dose should be replaced by administering a bolus dose or manual injection.

A temporary basal rate should be programmed to run 20-50% less than the current basal rate. This should be programmed to start 60-90 minutes before exercise, run over the duration of exercise and continue for 60-90 minutes after exercise.

Waterproof and water resistant pumps can be worn while swimming for extended periods of time.
Insulin Dose Adjustments for Exercise

Caitlin is planning a weekend cycling trip with her new bicycle club. She estimates that she will be travelling approximately 1 hour at a time and that she will be working at 25% of her capacity in the morning and at 50% of her capacity in the afternoon. Her blood glucose (BG) values have been relatively stable, as follows.

<table>
<thead>
<tr>
<th>Day</th>
<th>BG (mmol/L)</th>
<th>Insulin (units)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Break</td>
<td>Lunch</td>
</tr>
<tr>
<td>1</td>
<td>7.1</td>
<td>3.9</td>
</tr>
<tr>
<td>2</td>
<td>5.4</td>
<td>8.0</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Questions

1. What would you advise her to do with her insulin doses and/or food intake on the weekend? List 3 key recommendations that you would discuss with her.

Answer:

1. She should try to test out the dose adjustment before her weekend cycling trip, starting with a 50% reduction in her pre-breakfast bolus dose of insulin and a 50-75% reduction at lunch. The breakfast dose would be 4 units instead of 8 units and the lunch dose would be 1.5 to 3 units rather than 6 units.

2. She should lower her long acting insulin (levemir) by 20% the night after the bike ride or eat a bedtime snack to prevent nocturnal hypoglycemia

3. She should carry supplies for treating low BG with her and check her BG levels about 2 hours after each meal, looking for low BGs.