Impedance checks should be routinely performed during programming sessions to ensure accurate stimulation. Open circuit (OpC) and short circuit (ShC) are types of deep brain stimulation (DBS) hardware malfunction that can sometimes present as abnormal electrode and therapy impedance readings.

**Clinical presentation, type and evolution of the abnormal circuit, and eventual resolution**

In acute patients, surgical intervention and the marked progression of hypokinetic symptoms are consistent with Acute OpC and ShC (Table 2, left column). In the chronic patients, ShC (low Imp) with good symptom control may be observed for years before surgical intervention. If abnormal → directed surgical intervention

If normal → exploratory surgery with “system investigation” to identify the cause of hardware malfunction.

**Clinical manifestations**

Abnormal circuits involving either active or inactive electrodes can have different clinical manifestations from asymptomatic to sudden loss of effect.

**Table 2. Clinical manifestations in patients with abnormal impedance readings**

<table>
<thead>
<tr>
<th>Code</th>
<th>Target, IPG type</th>
<th>Contact involved</th>
<th>T1 (mo)</th>
<th>T2 (mo)</th>
<th>Symptoms</th>
<th>Surgical correction?</th>
<th>Location circuit abnormality</th>
<th>Disposition</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1</td>
<td>Activa PC</td>
<td>all contact 0 pairs</td>
<td>Active 24 4  mos</td>
<td>No effect of stimulation since surgery</td>
<td>Yes</td>
<td>Exclusion of surgical correction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O2</td>
<td>Activa SC</td>
<td>all contact 2 pairs</td>
<td>Active 36 6  mos</td>
<td>Gradual loss of previous effect</td>
<td>Yes</td>
<td>Surgical correction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**References**


2. Kinetra (N=1) 0.5 to >36 0 to 7

3. Activa SC (N=3) Gradual loss of effect (N=3)

4. New side effects from stimulation (often sensory) (N=1)

5. Surgical correction (N=2)

6. Spontaneous resolution (N=1)