

# Botulinum toxin type A application on a toddler with peripheral facial palsy – case report

## Abstract

Peripheral facial palsy (PFP) is a sudden weakness or paralysis of the facial muscles on one side of the face due to injury of the facial nerve. There are different approaches to PFP in children, which can range from pharmacological, physiotherapy or surgery. Botulinum toxin type A (BoNT) has been used for various conditions, including the treatment of muscle spasticity, migraines and sweating hyperhidrosis. The use of BoNT type A in peripheral facial paralysis has been studied as a potential treatment to improve facial symmetry and reduce complications such as synkinesis. The clinical case presented, reports the results of BoNT in a 1 year old toddler with PFP. Most of the research into BoNT for facial paralysis has been carried out in adult populations, although some larger-scale studies have explored the safety and efficacy of BoNT in children with other neurological and musculoskeletal conditions. Given the limited research on BoNT for pediatric PFP, more studies are needed to establish safety, efficacy, and optimal treatment protocols for this population.

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## Introduction

Peripheral facial palsy (PFP), also referred to as Bell's palsy, is a sudden weakness or paralysis of the facial muscles on one side of the face due to injury of the facial nerve. This condition was first described in 1821 by the Scottish surgeon Sir Charles Bell,<sup>1</sup> although the exact cause of Bell's palsy is not determined in up to 75% of cases, causes of PFP in children include viral infections, trauma, congenital conditions, tumors and autoimmune disorders.<sup>2</sup>

Symptoms of PFP in children can include sudden onset of weakness on one side of the face, with an inability to close the eye or blink on the affected side, loss of saliva or food from the lips on the affected side, downward deviation of the mouth or difficulty smiling, pursing the lips or frowning on the affected side. There may be a loss of taste sensation in the front two-thirds of the tongue, increased sensitivity to sound in one ear (hyperacusis), pain or discomfort around the jaw or behind the ear on the affected side.<sup>3</sup>

The severity of symptoms can vary from mild to severe, depending on the degree of nerve involvement. There are various severity grading scales such as the House-Brackmann Facial Nerve Grading Scale or the Sunnybrook Facial Nerve Grading System.<sup>4</sup> There are different approaches to PFP in children, which can range from pharmacological, physiotherapy or surgery.<sup>5,6</sup>

Botulinum toxin type A (BoNT) is a potent neurotoxin derived from the bacterium *Clostridium botulinum*. It has been used for various medical and cosmetic applications, including the treatment of muscle spasticity, migraines and sweating hyperhidrosis. The use of BoNT in PFP has been studied as a potential treatment to improve facial symmetry and reduce complications such as synkinesis (involuntary muscle movements).

Synkinesis is the involuntary movement of one set of muscles while trying to move another set, which can occur as a sequel to facial nerve damage (or Bell's palsy) due to abnormal re-innervation. BoNT can be injected into the affected muscles to temporarily weaken them and reduce involuntary movements, improving facial symmetry. It should be noted that this approach should not be carried out in an acute or sub-acute phase, where we want to gain muscle strength,

saving this intervention only for chronic phases where there is no longer any evidence of strength gains and where synkinesis becomes the main cause of discomfort, whether physical or psychological.<sup>7</sup>

Several studies have shown that injecting BoNT into the non-paralysed side of the face can help improve facial symmetry by temporarily weakening the unaffected facial muscles. This allows the affected muscles to regain strength and function more quickly by increasing muscle recruitment on the side without BoNT, an approach known as Restriction-Induced Movement Therapy.<sup>8,9</sup>

In more chronic stages, and in cases where facial paralysis results in significant asymmetry, BoNT can be injected into the non-paralyzed side of the face to help balance the overall facial appearance and promote a more symmetrical look.<sup>10</sup>

## Clinical case description

The clinical case in question concerns an 18-month-old Caucasian male patient, how was born through eutocic delivery, without complications. When he was 15 months old, his parents noticed a deviation in the opening of his mouth and the closing of the right eye. PFP was diagnosed. As the apparent cause could not be ascertained, it was considered idiopathic. When he arrived at our physical medicine and rehabilitation consultation, he had already undergone six weeks of corticosteroid therapy and started physiotherapy. On assessment, we confirmed facial asymmetry with difficulty opening the mouth on the right, causing visible asymmetry, especially when smiling or crying. The asymmetry during crying can be seen in figure 1.

In order to enhance the effectiveness of the treatments, it was decided to apply BoNT to the contralateral side to the paresis, with the aim of improving facial symmetry and enhancing therapeutic side through the effect of Restriction-Induced Movement Therapy. Therefore, 2.5 international units of botulinum toxin A were injected into the left *depressor anguli oris*.

The toddler was re-evaluated 5 weeks later, where we can see a significant increase in facial symmetry at rest and when crying, as well as a greater mouth opening on the affected side, so the proposed goal of the procedure was achieved. Figure 2,3 show the face 5 weeks after the procedure, at rest and when crying respectively.



**Figure 1** Facial asymmetry before BoNT injection.



**Figure 2** Facial symmetry at rest 5 weeks after BoNT injection.



**Figure 3** Facial symmetry during crying 5 weeks after BoNT injection.

## Discussion

The most common cause of PFP is believed to be viral infections, such as the herpes simplex virus, which can cause inflammation of the facial nerve. Facial nerve damage due to head trauma or iatrogenic surgical procedures can also lead to facial paralysis in children. Some children may be born with facial paralysis as a result of congenital disorders such as Mobius syndrome or Goldenhar syndrome. In rare cases, facial paralysis can be caused by a tumor compressing the facial nerve. Conditions such as Guillain-Barre syndrome and Lyme disease can also cause facial paralysis in children.<sup>2</sup>

In most cases, children with PFP recover spontaneously within three to six months, although some may continue to experience residual symptoms or complications.<sup>11</sup> The pharmacological approach should be adjusted depending on the cause of the paralysis. Medications such as corticosteroids, antiviral drugs or antibiotics can be used to help reduce inflammation, manage pain or treat infection.<sup>5</sup>

Some physiotherapy care can help muscle function recover more quickly. If the child is already able to cooperate, a physiotherapist can teach exercises to help the child regain facial muscle strength, coordination and control. Physiotherapy care can also include facial massage, stretching and mirror exercises to improve symmetry of movement. Depending on the child's age, a speech therapist and occupational therapist can help the child develop strategies for managing activities of daily living, such as eating, drinking and speaking.<sup>6</sup>

Something that cannot be overlooked when there is a limitation in ocular occlusion, whether it's the child's inability to blink or close their eyes, it is essential to protect the eye from dryness and irritation by lubricating it with eye drops or ointments. In this regard, and in more serious cases, ophthalmologists may be asked to help with more advanced measures (such as goggles).<sup>6</sup> Nor should we forget the potential difficulty of dealing with aesthetic changes, both for the child and the family. A psychologist can provide emotional support and coping strategies.<sup>6</sup>

In some cases, depending on the cause and severity, surgical intervention may be considered to improve facial function, such as facial nerve decompression, nerve grafts or muscle transfers. Referral to a surgeon specialized in these procedures is important in order to discuss the options and potential outcomes with the family.<sup>6</sup> Most of the research into BoNT for facial paralysis has been carried out in adult populations.<sup>10, 12</sup>

Some larger-scale studies have explored the safety and efficacy of BoNT in children with various neurological and musculoskeletal conditions, such as cerebral palsy, where it has been used to manage muscle spasticity.<sup>13, 14</sup>

Some research has been carried out and the results generally indicate that botulinum toxin can be a safe and effective treatment option for specific cases.<sup>13</sup> Nonetheless, as with any medical treatment, there are potential risks and side effects associated with the use of BoNT for PFP.

Some of these side effects may include pain, swelling, or bruising at the injection site, these are usually mild and resolves within a few days. Some patients may experience headaches after BoNT injections, which usually resolve within a few days.<sup>13</sup>

Drooping eyelids or eyebrows can occur if the toxin spreads to nearby muscles, resulting in temporary weakness. This side effect is generally rare and resolves within a few weeks. Difficulty swallowing or speaking can occur if the toxin spreads to the muscles involved in swallowing or speaking, although this side effect is also rare.<sup>10, 13</sup>

Allergic reactions may occur in rare cases. Patients can have an allergic reaction to BoNT, which can present as itching, rash, redness, or difficulty breathing.<sup>13</sup>

In the context of PFP in children, the use of BoNT can be considered on a case-by-case basis, depending on the severity and persistence of symptoms, as well as the potential risks and benefits of treatment. It is crucial to consult a specialist with experience in the application of BoNT in children before considering treatment with BoNT in children with peripheral facial paralysis.

It is important to note that BoNT is not a cure for PFP, but rather a treatment to manage symptoms and improve the patient's quality of life. Given the limited research on BoNT for pediatric PFP, more studies are needed to establish safety, efficacy, and optimal treatment protocols for this population.

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## Conflicts of interest

The author declares that there are no conflicts of interest.

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