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Overview Bell's Palsy

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Abstract
Bell's palsy is a condition that causes temporary paralysis of the muscles on one side of the face. It is caused by facial nerve inflammation that controls the facial muscles. The exact cause of Bell's palsy is unclear, but it is associated with viral infections such as herpes simplex, varicella-zoster, and Epstein-Barr. All genders and ages are affected with a higher risk in people with diabetes, hypertension, pregnant women, obesity, and people with upper respiratory tract infections. Potential pathogenesis includes factors related to facial nerve anatomy, viral infection, local ischemia and inflammation, cold exposure, and autoimmune response. This review aims to provide a focused understanding of the anatomy, clinical features, etiology, diagnosis, and therapy of Bell's Palsy.
Keyword: Bell's palsy; Paralysis; Theraphy;

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Introduction

Bell's Palsy is a neurological condition that causes temporary weakness or paralysis of the muscles on one side of the face (Heckmann, Urban, Pitz, & Guntinas-Lichius, 2019). Bell's Palsy typically manifests suddenly and can be alarming for those affected. Though the exact cause is unclear, it's believed to result from inflammation or compression of the facial nerve, which controls the muscles responsible for facial expressions and certain functions like blinking and smiling. Bell's Palsy is relatively common, with thousands of cases diagnosed each year around the world.

While it can affect individuals of any age, it is most commonly diagnosed in people between the ages of 15 and 60 (Mustafa & Sulaiman, 2018). The condition appears to affect both genders equally and can occur at any time, though it's more prevalent during pregnancy and in individuals with certain viral infections, such as the herpes simplex virus (which causes cold sores) or the varicella-zoster virus (which causes chickenpox and shingles) (Zhao, Feng, & Gao, 2015)

Bell's Palsy dates back to the early 19th century when Sir Charles Bell, a Scottish anatomist and surgeon, first described the condition (Zhao et al., 2015). Although the exact cause of Bell's Palsy remains elusive in many cases, it is generally recognized as a relatively common and usually self-limiting condition (Baugh et al., 2013)

Early intervention with medications such as corticosteroids can help reduce inflammation and improve outcomes, and physical therapy can help restore facial function for those affected by more severe cases. Overall, Bell's Palsy continues to be an area of active research and clinical interest, with ongoing efforts to better understand its underlying mechanisms and optimize treatment approaches for affected individuals.

Method

In this review, we retrieved the literature on Bell's palsy from PubMed, Web MD, Medscape, and Google Scholar

Etiopathogenesis

The exact etiology (cause) of Bell's Palsy remains incompletely understood, but several factors are believed to contribute to its development. Current research suggests that Bell's Palsy may result from inflammation or compression of the facial nerve (cranial nerve VII), which controls the muscles of facial expression. Here are some key factors implicated in the etiopathogenesis of Bell's Palsy:

Viral Infections: Viral infections are widely considered to play a significant role in the development of Bell's Palsy. The herpes simplex virus (HSV), particularly HSV-1, which is responsible for cold sores, has been implicated. Additionally, other viruses such as the varicella-zoster virus (VZV), which causes chickenpox and shingles, and the Epstein-Barr virus (EBV) have also been associated with Bell's Palsy (Zhao et al., 2015).

Immune Response: It is believed that viral infections may trigger an inflammatory response in the facial nerve, leading to swelling and compression. The immune system's reaction to the virus may also contribute to nerve damage in some cases. Autoimmune

mechanisms, where the body's immune system mistakenly attacks its tissues, have been proposed as potential contributors to Bell's Palsy (Heckmann et al. 2019).

Vascular Disorders: Some researchers suggest that vascular disorders, such as microvascular ischemia (restricted blood flow) to the facial nerve, could lead to nerve dysfunction and subsequent facial paralysis. However, the role of vascular factors in the pathogenesis of Bell's Palsy is still debated. (Zhao, Feng, and Gao 2015)

Genetic Predisposition: There may be a genetic predisposition to developing Bell's Palsy in some individuals. Studies have shown familial clustering of cases, suggesting a potential genetic susceptibility to the condition. However, specific genetic factors associated with Bell's Palsy have not been conclusively identified (Zhang et al., 2020)

Environmental Factors: Certain environmental factors, such as cold weather or exposure to drafts, have historically been associated with the onset of Bell's Palsy. While these factors may exacerbate symptoms in some cases, their direct role in the condition's etiology is uncertain (Zhang et al., 2020)

Clinical Presentation

The clinical symptoms of Bell's palsy are an ipsilateral, and acute lower motor neuron paralysis, which can make it difficult to close the eye on the affected side, smile, or raise the eyebrow. Drooping of the mouth or eyelid, The muscles on the affected side may droop, causing the corner of the mouth to sag and the eyelid to droop. Difficulty in facial expressions, drooling, difficulty in eating and drinking, decreased or altered sense of taste, and hypersensitivity to sound, Some people may experience heightened sensitivity to sound (hyperacusis) on the affected side (Somasundara & Sullivan, 2017)

The House-Brackmann Facial Nerve Grading System is a widely used clinical tool for assessing the severity of facial nerve dysfunction in patients with conditions such as Bell's Palsy (de Almeida et al., 2014). Developed by Drs. John W. House and Derald E. Brackmann in 1985, the scale provides a standardized method for quantifying the degree of facial weakness or paralysis based on subjective evaluation of facial muscle movement and function. The grading system ranges from Grade I (normal function) to Grade VI (total paralysis), with intermediate grades representing varying degrees of impairment. Here is an overview of the House-Brackmann grading scale:

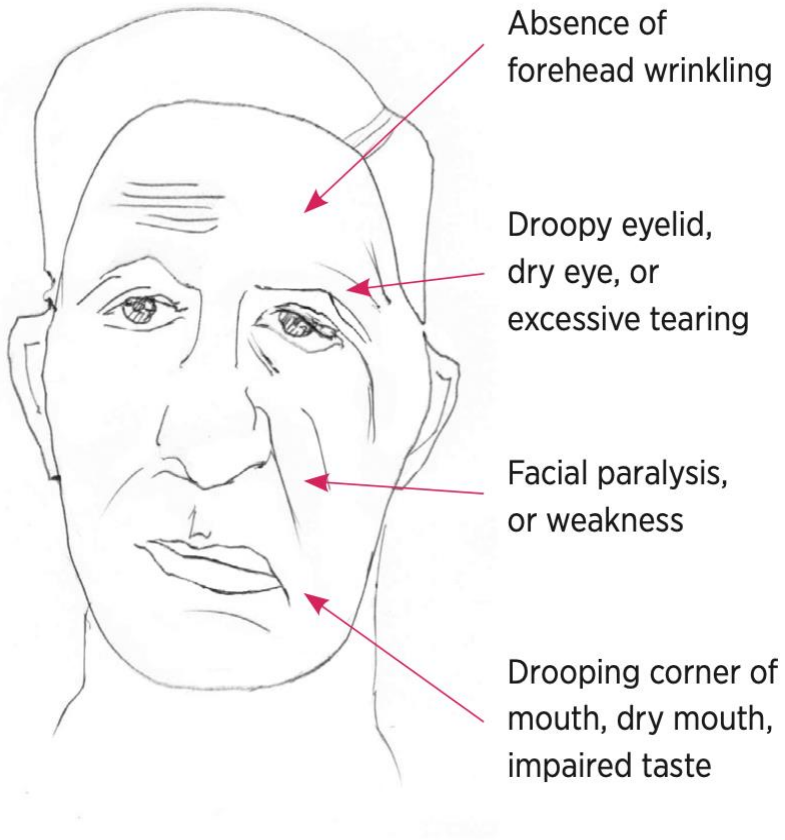

Figure 1. Depiction of clinical features of a patient with Bell's Palsy (Somasundara & Sullivan, 2017)

Table 1
House-Brackmann grading scale (Singh, Deshmukh, & Deshmukh, 2022)

Grade	Description	Characteristic
I	Normal	No facial weakness or asymmetry at rest or with movement.
II	Mild dysfunction	Slight weakness or asymmetry of facial expression, but normal forehead movement and eye closure.
III	Moderate dysfunction	Obvious weakness or asymmetry of facial expression, with incomplete eye closure and forehead movement.
IV	Moderate-severe dysfunction	Significant weakness or asymmetry of facial expression, with incomplete eye closure, forehead movement, and noticeable mouth deviation.
V	Severe dysfunction	Marked weakness or asymmetry of facial expression, with minimal or no eye closure and forehead movement, and significant mouth deviation.
VI	Total paralysis	Complete absence of facial movement, with no eye closure or forehead movement, and no mouth movement.

Diagnosis

1. Medical History:

The healthcare provider will ask about the onset and progression of symptoms, including any associated factors such as recent viral infections, exposure to cold weather, or a history of similar episodes. Information about past medical conditions, medications, and family history may also be relevant (Singh et al., 2022)

2. Physical Examination:

The healthcare provider will conduct a comprehensive neurological examination, focusing on assessing facial muscle strength, symmetry, and function (DO PATEL & Levin, 2015). Specific tests may be performed to evaluate the ability to close the eyelids, smile, raise the eyebrows, and perform other facial movements (Patel and Levin 2015). Assessment of other cranial nerves and neurological functions may be included to rule out other conditions (Patel and Levin 2015).

3. Exclusion of Other Conditions:

Bell's Palsy is a diagnosis of exclusion, meaning that other potential causes of facial paralysis must be ruled out. Conditions such as stroke, brain tumors, Lyme disease, Ramsay Hunt syndrome (herpes zoster oticus), and certain autoimmune disorders can

mimic the symptoms of Bell's Palsy but require different management approaches (Baugh et al., 2013). Additional tests may be ordered based on clinical suspicion, such as blood tests, imaging studies (e.g., MRI or CT scan), and electromyography (EMG) to assess nerve function and rule out alternative diagnoses.

4. Facial Nerve Function Tests:

Electroneurography (ENoG) and nerve conduction studies (NCS) may be used to assess the function and integrity of the facial nerve. These tests measure the electrical activity of the facial muscles in response to nerve stimulation and can help confirm the diagnosis of Bell's Palsy and assess the severity of nerve dysfunction.

5. Eye Examination:

Given the risk of corneal abrasions or ulcers due to impaired eyelid closure, an eye examination may be performed to assess the integrity of the cornea, tear production, and the need for protective measures such as artificial tears or eye patches (Patel and Levin 2015).

The diagnosis of Bell's Palsy is primarily clinical, based on characteristic signs and symptoms along with the exclusion of other potential causes of facial paralysis. Early diagnosis is important to initiate appropriate treatment and minimize complications. If there is uncertainty about the diagnosis or if symptoms are atypical, consultation with a neurologist or otolaryngologist may be recommended for further evaluation and management (DO PATEL & Levin, 2015)

6. Blood Tests:

Blood tests may be ordered to assess for signs of infection, inflammation, or autoimmune disorders that could affect the facial nerve or mimic the symptoms of Bell's Palsy. These tests may include Complete blood count (CBC), C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR). Serological tests for viral infections, such as herpes simplex virus (HSV), varicella-zoster virus (VZV), or Lyme disease (if clinically indicated). Autoimmune markers, such as antinuclear antibodies (ANA) or anti-double-stranded DNA (anti-dsDNA) antibodies (if autoimmune causes are suspected). (Heckmann et al., 2019)

7. Cerebrospinal Fluid examination:

In some cases, a lumbar puncture may be performed to analyze cerebrospinal fluid (CSF) for evidence of infection, inflammation, or other abnormalities suggestive of conditions affecting the central nervous system. This test may be indicated if there are concerns about viral meningitis, encephalitis, or other neurological disorders (Heckmann et al., 2019)

8. Electrodiagnostic Studies:

Electromyography (EMG) and nerve conduction studies (NCS) may be used to assess the function and integrity of the facial nerve and other nerves involved in facial movement. These tests can help confirm the diagnosis of Bell's Palsy and assess the severity of nerve dysfunction. However, they are usually reserved for cases where the diagnosis is uncertain or when there is a need to differentiate between Bell's Palsy and other causes of facial paralysis. (Heckmann et al. 2019)

9. Imaging Studies:

While not considered routine, imaging studies such as magnetic resonance imaging (MRI) or computed tomography (CT) scans of the head may be ordered in select cases to rule out structural abnormalities, tumors, or other lesions compressing or affecting the facial nerve. Imaging may also be indicated if there are atypical features or red flags suggesting an alternative diagnosis. (Heckmann et al. 2019)

Treatment

The treatment of Bell's Palsy typically involves a combination of medications, physical therapy, and supportive measures aimed at reducing inflammation, managing symptoms, and promoting recovery of facial function. Here are the main components of treatment:

1. Medications:

Corticosteroids: Oral corticosteroids, such as prednisone, are commonly prescribed to reduce inflammation and swelling of the facial nerve. Early initiation of corticosteroid therapy, ideally within 72 hours of symptom onset, has been shown to improve outcomes and accelerate recovery in some cases.

Antiviral Medications: Antiviral drugs, such as acyclovir or valacyclovir, may be prescribed in addition to corticosteroids, especially if a viral infection such as herpes simplex virus (HSV) is suspected as a contributing factor to Bell's Palsy.

Table 2

Bell palsy treatment recommendations for adults presenting within 72 hours (Patel and Levin 2015).

Class of Medication	Example
Corticosteroids	Prednisone 50 mg orally daily for 5 days, followed by 10 mg less each day for 5 days Prednisolone 50 mg orally daily for 10 days
Antivirals [a]	Valcyclovir 1 g three times daily for 7 days [b] Acyclovir 400 mg five times daily for 7 days [b]

[a] In combination with corticosteroids for moderate to severe weakness.
[b] Dose should be adjusted for patients with impaired renal clearance.

2. Eye Care:

Individuals with Bell's Palsy are at risk of developing corneal abrasions or ulcers due to difficulty closing the affected eye, leading to inadequate lubrication and protection. To prevent eye complications, artificial tears or lubricating eye ointments may be recommended to keep the eye moist and protect the cornea. In severe cases, temporary eyelid closure may be facilitated with the use of an eye patch or adhesive tape (Eviston, Croxson, Kennedy, Hadlock, & Krishnan, 2015), (Patel and Levin 2015)

Prognosis

The prognosis of Bell's Palsy is generally favorable, with the majority of individuals experiencing spontaneous recovery of facial function within three to six months, even without specific treatment (Patel and Levin 2015).

Early initiation of corticosteroid therapy, typically within 72 hours of symptom onset, has been shown to improve the likelihood and speed of recovery in some cases. (Patel and Levin 2015)

Conclusion

Bell's Palsy is a neurological condition that causes temporary weakness or paralysis of the muscles on one side of the face. The etiology of Bell's Palsy is still unclear, but there are several theories associated with the incidence of Bell's Palsy such as viral infection, ischemia, inflammation, and cold stimulation. The clinical symptoms of Bell's palsy are an ipsilateral, and acute lower motor neuron paralysis, drooping of the mouth or eyelid, difficulty in facial expressions, drooling, difficulty in eating and drinking, decreased or altered sense of taste, and hypersensitivity to sound. Treatment options such as corticosteroids and antiviral medications may help speed up recovery and reduce symptoms. The prognosis is generally good for most people.

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