

The Role of Surgical Decompression in Bell's Palsy: An Analytical Review

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Abstract. Introduction: Bell's palsy is a sudden onset of unilateral facial paralysis due to facial nerve dysfunction. While most patients recover spontaneously within weeks, some experience long-term deficits affecting quality of life. Surgical decompression has been considered for severe cases with poor prognostic indicators. Methodology: An analytical literature review was conducted on nine articles published between 2013 and 2024, focusing on decompression surgery in Bell's palsy. Articles were selected from Scielo, PubMed, and LILACS using keywords like "Bell's palsy," "facial nerve decompression," and "idiopathic facial nerve paralysis." Inclusion criteria were English and Portuguese articles involving surgical procedures; duplicates and older studies were excluded. Results: The evidence on surgical decompression's efficacy is conflicting. Some studies advocate early surgery for patients with complete paralysis and over 90% degeneration on electroneurography within 14 days of onset. However, major guidelines, including those from the AAO-HNSF, do not recommend it due to insufficient high-quality evidence and potential risks like hearing loss and facial nerve injury. Discussion: Surgical decompression's role remains controversial. While early intervention may benefit select patients, risks and logistical challenges hinder its adoption. Conflicting evidence and lack of consensus on surgical approaches contribute to the debate. High-quality randomized controlled trials are lacking. Conclusion: Current evidence is inadequate to support routine use of surgical decompression in Bell's palsy. Decisions should carefully weigh potential benefits against risks. Further research is needed to establish clear guidelines on its role in management.

Keywords. Bell's palsy, facial nerve, facial paralysis, idiopathic facial nerve paralysis, therapeutics, facial nerve decompression

1. Introduction

Idiopathic facial nerve palsy, also known as Bell's palsy, is the most common cause of spontaneous peripheral facial paralysis, leading to a partial or complete inability to voluntarily move facial muscles on the affected side of the face. [1] It most commonly is unilateral and occurs with equal frequency on either side of the face. Other additional symptoms of Bell's palsy may include mild pain in or behind the ear, oropharyngeal or facial numbness, impaired tolerance to ordinary levels of noise, and disturbed taste on the anterior part of the tongue. [2]

For the pathogenesis of Bell's palsy, reactivation of Herpes Simplex virus type 1 is presumed to be the most relevant infection (Varicella zoster virus and human herpesvirus 6 are also common), but in most cases, the etiology is unknown. [3] It is thought to result from facial nerve inflammation and edema; as the facial nerve

travels in a narrow canal, swelling may lead to nerve compression and result in temporary paralysis or permanent nerve damage. [1]

When evaluating a patient with suspected Bell's palsy, one should consider the rapid onset of less than 72 hours. It occurs more in the age group from 15 to 45 years old, with an incidence of 20 in 100,000 people a year and no gender difference. Risk factors include pregnancy, obesity, chronic hypertension, severe preeclampsia, and diabetes. [1,4]

Most importantly, it is a diagnosis of exclusion, requiring careful clinical elimination of other potential etiologies of facial paralysis, such as neoplasms, congenital or syndromic problems, infection by zoster, trauma, and Lyme disease. [4,5] Considering these differential diagnoses of acute facial paralysis/paresis, numerous diagnostic tests have been used, including imaging (CT or magnetic resonance imaging) to identify other potential

causes for facial nerve involvement; electrodiagnostic testing to stimulate the facial nerve to assess the level of facial nerve insult; serologic studies to test for infectious causes; hearing testing to determine if the cochlear nerve or inner ear has been affected; vestibular testing to determine if the vestibular nerve is involved; and Schirmer tear testing to measure the eye's ability to produce tears. [1]

Bell's palsy is typically self-limited, with patients showing some recovery within 2 to 3 weeks. People failing to show signs of improvement by 3 weeks and complete recovery within 3 to 4 months may have suffered severe degeneration of the facial nerve or may have an alternative diagnosis. Incomplete recovery of facial expression has a long-term impact on quality of life and self-esteem, with patients experiencing profound social distress, depression, and social alienation. [1,2]

As a result of that, treatment is often initiated in an attempt to decrease the likelihood of incomplete recovery, to increase the speed of recovery, to prevent progression from partial to complete facial palsy, to reduce the incidence of motor synkinesis and contracture, and to reduce the risk of eye injury. [1,2]

Medical therapy in the form of immunosuppressants, antivirals, and/or steroids may be indicated based on work-up and suspected etiology; also, protective measures preventing corneal exposure, and physical therapy or chemodenervation with botulinum toxin are offered to patients who develop synkinesis. [6]

In that context, recently, decompressive surgical management has emerged as a possible treatment option in Bell's palsy, as the proposed pathophysiology is swelling and entrapment of the nerve, especially in severely affected patients with early motor nerve conduction studies that show at least 90 percent degeneration of the facial nerve in the first 3 to 14 days after symptom onset. [7,8]

2. Methodology

The proposal was to carry out an exploratory, analytical-descriptive literature review in which the original scientific articles published in full were selected, related to Bell's palsy and surgery in its treatment.

A total of 11 articles were collected and analyzed for this investigation located in Scielo, PubMed, LILACS. The search period selected was from 2013 to 2024.

I included all english and portuguese research articles involving surgical procedures in Bell's Palsy treatment. Were excluded duplicated papers in sites, of them which did not have decompression surgery as an treatment and the ones with more than 15 years.

The Mesh and DeCS keywords used to locate the articles were: Bell's palsy, facial nerve, facial paralysis, idiopathic facial nerve paralysis, therapeutics, facial nerve decompression.

3. Results

Following the selection process of scientific articles, in accordance with the following inclusion criteria constructed to achieve the objectives of this review, there are still nine articles related to the topic decompression surgery in Bell's palsy.

Table 1 lists the seven articles included in this study.

4. Discussion

The role of surgical decompression in the management of Bell's palsy remains a subject of debate due to conflicting evidence and varying recommendations across clinical guidelines. While some studies advocate for early surgical intervention in select cases, others highlight the risks and lack of definitive evidence supporting its efficacy.

Several researchers have suggested that surgical decompression may benefit patients with severe Bell's palsy who exhibit poor prognostic indicators, such as complete facial paralysis and greater than 90% degeneration on electroneurography (ENoG) testing [1, 3, 9, 10]. For instance, Gantz et al. advocated that surgical decompression medial to the geniculate ganglion be performed within two weeks when ENoG exceeds 90% degeneration [1]. Similarly, studies have demonstrated that early middle fossa decompression within 14 days of onset yields better outcomes compared to delayed intervention [9, 10].

However, major guidelines, including those from the American Academy of Otolaryngology—Head and Neck Surgery Foundation (AAO-HNSF), do not recommend surgical decompression for Bell's palsy due to the variable quality of evidence and potential risks [3,4,6]. A Cochrane review reported low-quality and insufficient evidence supporting the feasibility of surgical intervention for Bell's palsy [3,8]. Previous systematic reviews have concluded a

lack of definitive benefit from surgery, citing factors such as small trial sizes, diversity of patient populations, and variable surgical approaches [1,8].

Potential serious harms of surgical

decompression include permanent hearing loss, facial nerve injury, cerebrospinal fluid leak, and other complications inherent to craniotomy procedures [1,7,9]. Given these risks and the lack of high-quality evidence, the decision to perform surgical decompression remains controversial [1,7].

Tab. 1 - The nine articles included in this study

Authors (year)	Country	Background	Key Findings
Lee et al. (2020)	South Korea	This study reviews recent literature on facial palsy guidelines and provides systematic reviews on related topics of interest.	Various changes have been made, not only in the facial nerve grading systems, but also in medical treatments, from surgical procedures to rehabilitation, during the last decade.
Baugh et al. (2013)	USA	Build a guideline to improve the accuracy of diagnosis for Bell's palsy, to improve the quality of care and outcomes for patients with Bell's palsy, and to decrease harmful variations in the evaluation and management of Bell's palsy	The timing and outcomes for patients with and without surgical facial nerve decompression need to be compared. More specifically, the surgical approach (ie, middle fossa), age (young vs old), and time to improvement from onset of paresis/paralysis to recovery (with levels of recovery) need to be compared with traditional medical management groups (ie, steroids and/or antivirals).
Shokri et al. (2020)	USA	Evaluate national trends in care of Bell's palsy, to identify the types of treatments patients are receiving and treatment gaps and identify if newer, more complex surgical therapies published in the literature are being employed.	Limited literature has shown an increase in use of pharmacotherapy as well as techniques including physiotherapy, chemodenervation and various surgical therapies, these interventions may be underutilized, in which surgical intervention should be considered as a last-line management modality
Ronthal et al. (2023)	USA	Literature review	The authors concluded that there is insufficient evidence to decide whether surgery for Bell's palsy is beneficial. Similar conclusions were reached in an earlier systematic review
Kim et al. (2020)	South Korea	This study investigated the effects of facial nerve decompression in patients with severe Bell's palsy who were expected to have a poor prognosis.	Facial nerve decompression surgery in severe Bell's palsy patients did not significantly improve prognosis beyond that offered by conservative treatment alone. Additional surgical decompression may not be necessary in patients with severe Bell's palsy if they receive sufficient conservative treatment.

Menchetti et al. (2021)	United Kingdom	Metanalysis to update a review first published in 2011, last updated in 2013. The update includes evidence from one newly identified study	Current evidence of low certainty from randomized controlled trials (RCTs) and quasi-RCTs on surgical treatment for early Bell's palsy is insufficient to determine whether surgical intervention offers benefits or poses risks.
Casazza, et al. (2018)	USA	Systematic review with meta-analysis identifying all studies meeting inclusion criteria and published between 1985 and 2015 was performed.	Middle fossa decompression (MFD) performed within 14 days of symptom onset results in better facial nerve outcome than MFD performed after 14 days. TMD does not offer improved outcomes over medical management however decompression was only offered after 15 days of symptom onset.
Lee, et al. (2019)	South Korea	Compared the therapeutic efficacy of facial nerve decompression (FND) and conservative treatment in patients with Bell's palsy through a systematic review and meta-analysis.	Facial nerve decompression can be a possible treatment option in patients with complete Bell's palsy, especially for complete recovery. In subgroup analyses, the recovery of facial nerve function was similar regardless of the surgical approach.
Shie, et al. (2016)	China	Systematic review which surgical timing was classified into four sub-groups: <2 weeks, 2 weeks-1 month, 1-2 months, and >2 months.	Surgical decompression performed within 2 weeks yields the best clinical prognosis for patients it also demonstrated that surgical exploration performed within 2 months results in acceptable outcomes.

Logistical challenges also hinder the widespread adoption of surgical decompression. These include the need for timely patient evaluation, as benefits are associated with surgery performed within a narrow window of symptom onset (often within 14 days) [1,9,10]. Additionally, there are currently few clinicians able to perform this procedure due to its technical difficulty and the rarity of suitable candidates [1].

While some studies have shown that early decompression may lead to better outcomes, others have not found significant differences when surgery is performed later [9,11]. For example, Kim et al. found that patients with severe Bell's palsy did not benefit from delayed decompression surgery performed two months after disease onset [9]. Furthermore, the optimal surgical approach remains contentious. The middle cranial fossa approach allows access to the labyrinthine segment

of the facial nerve but carries significant risks, whereas the transmastoid approach is less invasive but may be less effective [3,9,10].

In conclusion, although surgical decompression may offer benefits to a select group of patients with severe Bell's palsy and poor prognostic indicators, the current evidence is insufficient to support its routine use. The decision to proceed with surgery must carefully weigh the potential benefits against the risks and logistical considerations. High-quality, large-scale randomized controlled trials are needed to establish clear guidelines on the role of surgical decompression in the management of Bell's palsy.

5. Conclusion

The efficacy of surgical decompression in the

treatment of Bell's palsy remains a subject of considerable debate. While some studies advocate for early surgical intervention in patients exhibiting severe symptoms and poor prognostic indicators—such as complete facial paralysis and greater than 90% degeneration on electroneurography testing—there is insufficient high-quality evidence to support its routine use. Major clinical guidelines, including those from the American Academy of Otolaryngology—Head and Neck Surgery Foundation (AAO-HNSF), do not recommend surgical decompression due to the potential risks and lack of definitive benefit demonstrated in controlled studies.

6. References

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