



## Review article

# Absence of neurovascular conflict during microvascular decompression while treating essential trigeminal neuralgia. How to proceed? Systematic review of literature<sup>☆</sup>



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## ABSTRACT

**Introduction:** Neurovascular conflict is the most accepted hypothesis for the cause for trigeminal neuralgia. Microvascular decompression of the trigeminal nerve is the most common surgical treatment for these patients. However, despite advances in diagnostic techniques, neurovascular conflict is sometimes not detected during surgery. The aim of this paper is to systematically review all the options available to best manage this scenario.

**Results:** Several techniques that could be used during microvascular decompression for trigeminal neuralgia in the absence of neurovascular conflict have been described. The success rates of these techniques, pain recurrence rates and rates of complications are also reported. Finally, we provide suggestions based on our experience.

**Conclusions:** There is no gold standard, but several techniques could be successfully used in the absence of neurovascular conflict. The use of destructive techniques, such as PSR, should be held as treatments of last resort.

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## Ausencia de conflicto neurovascular durante la microdescompresión vascular en el manejo de la neuralgia trigeminal esencial: ¿qué hacer? Revisión sistemática de la literatura

### R E S U M E N

#### Palabras clave:

Microdescompresión vascular fallida  
Neuralgia trigeminal  
Conflicto neurovascular  
Rizotomía parcial sensitiva  
Neurólisis interna

**Introducción:** La presencia de conflicto neurovascular es la hipótesis aceptada en el desarrollo de la neuralgia trigeminal y la microdescompresión vascular, la técnica quirúrgica más empleada en su tratamiento. Sin embargo, pese a los avances diagnósticos, en ocasiones dicho conflicto es indetectable intraoperatoriamente. El objetivo de este trabajo es revisar sistemáticamente las opciones de manejo ante dicha situación.

**Resultados:** Existen diversas técnicas descritas que se pueden emplear ante la ausencia de conflicto neurovascular durante una microdescompresión vascular. Describimos dichas técnicas, sus tasas de éxito, la recurrencia del dolor y de complicaciones, y damos nuestras recomendaciones sobre la materia.

**Conclusiones:** No existe un consenso terapéutico, pero se dispone de diversas opciones quirúrgicas ante la ausencia de conflicto neurovascular. Creemos que las técnicas destructivas como la RPS deben relegarse a última línea terapéutica.

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## Introduction

Microvascular decompression (MVD) in essential trigeminal neuralgia (TN) management was indicated by Dandy in 1934<sup>1,2</sup> and later pushed by Jannetta in 1967.<sup>3</sup> It is a widely accepted surgical procedure when pharmacological treatment is ineffective. The most accepted pathophysiological basis stems from the existence of neurovascular conflict (NVC), i.e. compression of the trigeminal nerve by the surrounding vascular structures.<sup>4</sup> This conflict is identified in 80–90% of patients who undergo the procedure.<sup>5–9</sup> Burchiel's aetiological classification—the most commonly used for trigeminal pain—does not consider the presence of NVC as a criterion when establishing TN subtypes. Nevertheless, the TN-1 and TN-2 subtypes, known as “essential TN” are those in which the presence of NVC has been proposed as an aetiological mechanism (see the foot of [Table 1](#) for the complete classification).

According to various published studies,<sup>6,10</sup> 75–80% of patients who undergo the procedure present an alleviation of their pain in the immediate postoperative period and 70% of patients are pain free at 10 years' follow-up. The global rate of complications for this procedure is 10–23%.<sup>4,6</sup> Some 17–31% of patients present pain recurrence, most commonly in the first two years.<sup>6,11–14</sup> The predictive factors for therapeutic success without recurrence are: duration of symptoms less than 8 years, TN-1 (typical) symptomatology, constant cutaneous distribution and the presence of arterial vascular compression.<sup>15</sup>

Imaging-based diagnostic techniques have gradually improved, with MRI and angio-MRI, predicting the presence of NVC with a sensitivity above 96% and specificity of 90% for TN-1 and 66% for TN-2.<sup>16</sup> Various radiological studies have reported an absence of NVC in some 3–17%.<sup>12</sup> In most of these patients, NVC was not found intraoperatively.<sup>11,12,16–18</sup>

In 1934, Dandy, and later other authors, indicated that NVC can occur without associated neuralgia and that the disease may be present in the absence of the above-mentioned intraoperative finding in some 5–21%.<sup>1,11,12,14,16–18</sup> In 2009, Miller et al. evaluated the presence of NVC in a series of 257 patients and healthy subjects and determined that, although NVC could be present in asymptomatic subjects, it was often more intense and more proximal in those who developed symptoms.<sup>19</sup> This points to an absence of NVC in a certain percentage of TN patients, and a pathophysiology substrate that has not been fully understood until now.<sup>7,14,17,20,21</sup> A number of alternative theories on the possible aetiology of TN have arisen based on this evidence, with NVC currently remaining the most widely accepted despite not applying to all patients.<sup>1,7,21–23</sup>

The objective of this publication is to review those surgical options proposed in the literature that the surgeon might employ in the same surgical intervention when faced with the absence of NVC and to express our opinion on those options based on our own experience.

## Materials and methods

A bibliographic search of the PubMed, Scielo and Springer-Link scientific databases was performed using the keywords: rhizotomy of trigeminal nerve, tractotomy, neurolysis, failed microvascular decompression and atypical trigeminal neuralgia. Articles published in the last 10 years were reviewed, and it was deemed relevant to mention some older articles cited in the reviewed articles due to their historical interest.

Articles were reviewed in English, Spanish, German and French, as well as English abstracts of articles published in other languages.

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